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ABSTRACT

A 1987 study that examined the economic performance of 23,500 graduates in 1983 of 14 vocational programs in Ohio used federal income tax records. Twelve of the programs with 21,857 graduates were at the secondary level, and 2 with 1,643 graduates were at the associate level. The incomes of vocational graduates were compared to income of equivalent groups in the general population. The study also investigated the geographic mobility of vocational graduates since 1979. Results showed predominantly higher incomes for vocational graduates than for the general population. The result varied by vocational program, but the ratios were higher than 1 for the 1979 graduates in all programs. The income advantage ranged from 10 to 79 percent for graduates of secondary programs and from 11 to 68 percent for graduates of associate programs. (An executive summary and 46 tables and diagrams are provided.) (YLB)

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1983 Vocational Education Graduates

in 1987

A Study Based on Federal Income Tax Data

by

I. A. Ghazalah

Professor of Economics
Ohio University

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Executive Summary

Ohio University
Athens, Ohio 45701
1993

The economic performance of graduates of vocational programs is a primary factor in the evaluation of vocational education. This study evaluates the performance of students who completed state-funded vocational job-training programs in Ohio.

The study uses an original source of information – federal income tax records. The data were provided in batch form by the Internal Revenue Service from its Information Returns Master File in full compliance with the strict requirements regarding disclosure of personal information.

This study examines the performance in 1987 of 23,500 graduates in 1983 of fourteen vocational programs. Twelve of the programs with 21,857 graduates were at the secondary level, and two with 1,643 graduates at the associate (second-year college) level.

The incomes of vocational graduates were compared to those in the general population at the same age bracket, educational achievement and geographical location. Data on the equivalent groups in the general population were based on Bureau of the Census, Money Income of Households, Families and Persons in the United States, 1987 and East North Central 1988 Population and 1987 Per Capita Income Estimates for Counties and Incorporated Places.

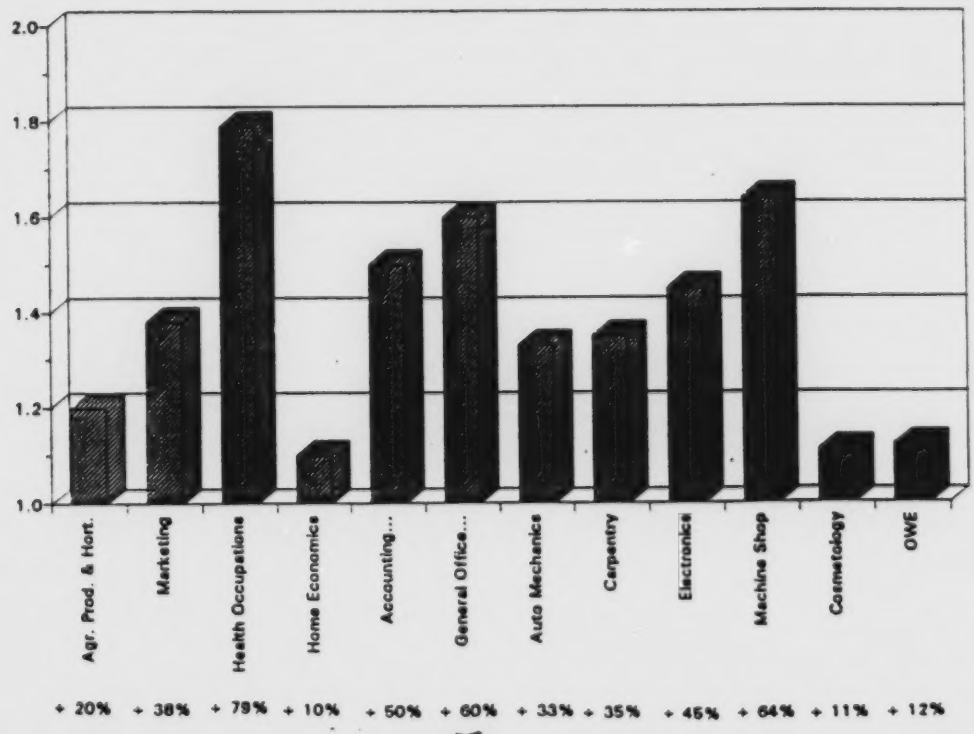
The results of the study indicate predominately higher incomes of vocational graduates than others in the general population who are of the same age bracket and years of schooling, i.e. 18-24 years old and 4 years of high school for Secondary Vocational graduates, and 25-34 years old and 1-3 years of college for Associate Vocational graduates.

The following tables and the corresponding graphs show the ratio in 1987 of the average income earned by 1983 vocational graduates to the average income of the equivalent group. The ratios for graduates of all secondary and associate programs are higher than 1. The income advantage ranges from 10% to 79% for graduates of secondary programs and 11% and 68% for graduates of associate programs.

Ratios of Mean Income of 1983 Secondary Vocational Graduates to Mean Income of Equivalent Group in the General Population (1987 Tax Year)

Vocational Program	*Vocational Graduates Compared to Equivalent Group*	
	Mean Income Ratio	Percentage Advantage
Agricultural Production and Horticulture	1.20	20%
Marketing	1.38	38%
Health Occupations Education	1.79	79%
Home Economics	1.10	10%
Accounting, Computing and Business Data Processing	1.50	50%
General Office Clerk, Stenographic, Secretarial and Related Occupations	1.60	60%
Auto Mechanics	1.33	33%
Carpentry	1.35	35%
Electronics	1.45	45%
Machine Shop	1.64	64%
Cosmetology	1.11	11%
Occupational Work Experience	1.12	12%

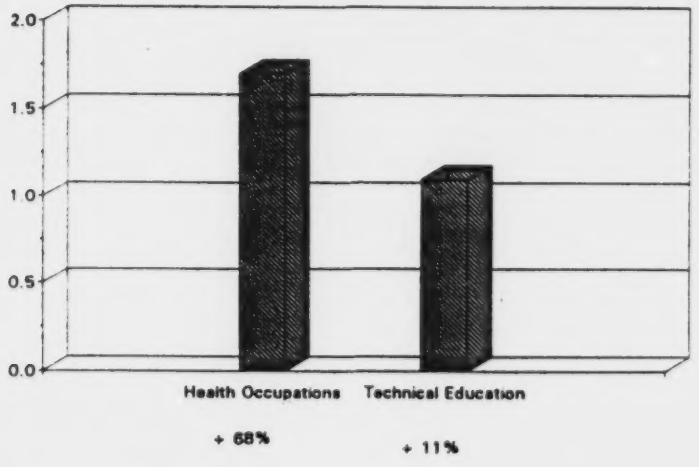
Secondary Programs



Ratios of Mean Income of 1983 Associate Vocational Graduates to Mean Income of Equivalent Group in the General Population (1987 Tax Year)

Vocational Program	*Vocational Graduates Compared to Equivalent Group*	
	Mean Income Ratio	Percentage Advantage
Health Occupations Education	1.68	68%
Technical Education	1.11	11%

Associate Degree Programs



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Ohio University

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Athens, Ohio 45701
1993

The research project reported herein was performed pursuant to agreement with the Ohio Department of Education's Division of Vocational and Career Education. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. This research does not necessarily represent official positions of the Ohio Department of Education.

Ted Sanders
Superintendent of Public Instruction
State of Ohio

It is the policy of the Ohio Department of Education, Division of Vocational and Career Education, that educational activities, employment, programs, and services are offered without regard to race, color, national origin, sex, religion, handicap, or age.

PREFACE

The purpose of this study is to evaluate vocational education by examining the economic performance of vocational graduates. In its measurement of this performance, the study uses an original source of information – federal income tax records. The Internal Revenue Service provided the data in batch form in full compliance with the strict requirements for protection of personal information.

I am deeply indebted to many individuals and organizations for their assistance and cooperation in the design and implementation of this study. At the Internal Revenue Service, Dr. Fritz Scheuren, Director, Statistics of Income Division lent his gracious support and encouragement to the research effort. Mr. Peter Sailer provided encouragement, valuable coordination and advice. Ms. Dodie Riley was a source of insightful advice, unfailing support, effectiveness and genuine interest in the project. Ms. Cathy Katz and Mr. Ray Salen organized and processed the data with ability and dedication.

Dr. Darrell L. Parks, Director, Vocational and Career Education, Ohio Department of Education gave his persistent and keen support to the research project. Dr. G. James Pinchak, Associate Director, was a valuable source of encouragement, judicious coordination and advice at different stages of the research.

Mr. David Sarchet served very ably in computer programming and data processing. Mr. Matloob Piracha performed important data processing and research assistance. Ms. Elisha Nuzum and Ms. Catherine Kupec provided capable and dedicated research assistance. Ms. Shahida Abubakar, Ms. Sri A. Abubakar, Mr. Nanda J. Karanaganda, Ms. Wai Man Wong, Mr. Naiying Yu, Mr. Zhang Yu, and Ms. Xiu-Zhen Zhao performed effective data processing and research assistance. Mr. Rob Painter provided valuable assistance including graphic map design. Mrs. Becky Huff performed the task of processing, typing and related graphics. She did so with high ability, patience, and dedication.

Athens, Ohio

I. A. Ghazalah

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CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

Vocational education, as all forms of education, has a multi-dimensional effect on the welfare of individuals and society. Determination of the economic performance of graduates of vocational programs is essential to the process of decision making over the allocation of a given set of scarce resources among numerous competing uses.

Studies of the economic performance of vocational education graduates generally rely on earnings and related data gathered through personal surveys. Such follow-up studies have a number of limitations:

1. small percentage of returns in the form of completed questionnaires,
2. doubt about the randomness of returns, i.e. that they represent a random sample of the surveyed population,
3. doubt about the accuracy of information provided, partly because the individuals surveyed may not have the information readily available in the form sought by investigators. Particularly in the case of income earned over a full year (let alone various categories of income), the data obtained could suffer from significant inaccuracies.

In its measurement of the economic performance of graduates of vocational programs, this study uses an original source of information – federal income tax records. The federal income tax source avoids a number of limitations associated with follow-up studies utilizing questionnaires. The tax data records are standardized by type of income and by period (tax year), and do not rely on the memory nor the selectivity of individual responses to questionnaires. The data were provided in batch form by the Internal Revenue Service from its Information Returns Master File in full compliance with the strict requirements regarding disclosure of personal information.

Methodology

The study seeks to measure the economic performance in 1987 of 23,500 graduates in 1983 of fourteen vocational programs in Ohio. Twelve of the programs with 21,857 graduates were secondary vocational programs. A total of 1,643 graduated from two associate programs.

Each of the vocational graduates was identified by social security number and the code of the vocational program completed. Furthermore, each of the graduates was identified by the school attended. The school location was then used to group trainees by geographical region. The State of Ohio was divided into five regions: Central, Northeast, Northwest, Southwest, and Balance of Ohio. The first four regions contain only metropolitan statistical areas. The Central Region included the Columbus Metropolitan Statistical Area (MSA); the Northeast Region: the Akron Primary Metropolitan Statistical Area (PMSA), the Canton MSA, the Cleveland PMSA, the Lorain-Elyria PMSA, Jefferson County in the Steubenville-Weirton MSA, and the Youngstown-Warren MSA. The Northwest Region included the Lima MSA and Toledo MSA, while the Southwest Region was comprised of Clermont, Hamilton and Warren counties in the Cincinnati PMSA, and the Dayton-Springfield MSA. The region "Balance of Ohio" included Mansfield MSA, Washington county in the Parkersburg-Marietta MSA, as well as all non-MSA counties in the State of Ohio. Table I-A lists these regions by component counties. Diagram I-B shows the five Ohio regions on a state map.

Under a negotiated agreement with the Internal Revenue Service, the Statistics of Income Division of IRS was provided on a magnetic tape with a list of social security numbers in sequence of the vocational education graduates coded by vocational program attended. In addition, the Internal Revenue Service was furnished on hard copy with a list of all zip codes included in each of the five Ohio geographic regions. The list was developed using the following source materials:

1. Bureau of the Budget, Office of Management and Budget, Standard Metropolitan Statistical Areas: Titles and Definitions, 1985 and 1986,
2. National Technical Information Service, U.S. Department of Commerce, Five-Digit Zip Code Area Data (from 1985 and 1986 returns), Area four, Codes 43000 through 45899,
3. U.S. Postal Service, Map: National Service Area 4 (including Ohio) showing 3-Digit Zip Code Boundaries.

The Internal Revenue Service utilized its Information Returns Master File to prepare data on the vocational education graduates. A completed table was provided by IRS for each vocational program, in each of the five Ohio regions as well as in a sixth (outside Ohio) region.

TABLE I-A

LIST OF STATE GEOGRAPHIC REGIONS

The State of Ohio was divided into five geographic regions. Four of the regions (Central, Northeast, Northwest, and Southwest) contain only metropolitan statistical areas. The fifth region, Balance of Ohio, includes the Mansfield MSA and Washington County of the Parkersburg-Marietta MSA, as well as all non-MSA counties in the State of Ohio.

The components of each of the regions are listed below:

1. CENTRAL OHIO
Columbus MSA (Delaware, Fairfield, Franklin, Licking, Madison, Pickaway, and Union counties)

2. NORTHEAST OHIO
Akron PMSA (Portage and Summit counties)
Canton MSA (Carroll and Stark counties)
Cleveland PMSA (Cuyahoga, Geauga, Lake, and Medina counties)
Lorain-Elyria PMSA (Lorain county)
Steubenville-Weirton MSA (Jefferson county)
Youngstown-Warren MSA (Mahoning and Trumbull counties)

3. NORTHWEST OHIO
Lima MSA (Allen and Auglaize counties)
Toledo MSA (Fulton, Lucas, and Wood counties)

4. SOUTHWEST OHIO
Cincinnati PMSA (Clermont, Hamilton, Warren counties)
Dayton-Springfield MSA (Clark, Greene, Miami, and Montgomery counties)

5. BALANCE OF OHIO
Mansfield MSA (Richland county)
Parkersburg-Marietta MSA (Washington county)
All Non-MSA Counties: Adams, Ashland, Ashtabula, Athens, Belmont, Brown, Butler, Champaign, Clinton, Columbiana, Coshocton, Crawford, Darke, Definance, Erie, Fayette, Gallia, Guernsey, Hancock, Hardin, Harrison, Henry, Highland, Hocking, Holmes, Huron, Jackson, Knox, Lawrence, Logan, Marion, Meigs, Mercer, Monroe, Morgan, Morrow, Muskingum, Noble, Ottawa, Paulding, Perry, Pike, Preble, Putnam, Ross, Sandusky, Scioto, Seneca, Shelby, Tuscarawas, Van Wert, Vinton, Wayne, Williams, and Wyandot.

Diagram I-B
State Geographic Regions

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The latter region included those among the vocational graduates who were identified as non-Ohio residents, since their listed zip codes were not among those identifying the five Ohio regions.

The IRS Statistics of Income Division reviewed all tables to assure that no cell contained data on less than 10 individuals, in compliance with disclosure requirements. When necessary, data cells were combined. Furthermore, all tables were scrutinized and cleared by the IRS Disclosure Division before their release.

In Chapter II, we will report on and analyze the earnings and geographic mobility of the 1983 Secondary Vocational graduates in 1987 four years following their graduation. Chapter III will deal with the income and geographic mobility of graduates of the two associate vocational programs. In each of these, the performance in 1987 of the 1983 vocational graduates will be compared with that of the 1982, 1981 and 1980 vocational graduates in 1986, 1985 and 1984, respectively. The same data base, vocational programs and analytical techniques were used for the four chronological groups of vocational graduates.

The final chapter, Chapter IV, presents a summary of the findings, conclusions and recommendations.

CHAPTER II

THE 1983 SECONDARY VOCATIONAL EDUCATION GRADUATES

CHAPTER II

THE 1983 SECONDARY VOCATIONAL EDUCATION GRADUATES

The study included 21,857 graduates in 1983 of twelve secondary vocational programs in Ohio. In this chapter, we will report on and analyze the earnings and geographic mobility of the 1983 Secondary Vocational graduates in 1987, four years following their graduation. The performance and geographic mobility in 1987 of the 1983 Secondary Vocational graduates will be compared with that of the 1982, 1981 and 1980 Secondary Vocational graduates in 1986, 1985 and 1984, respectively.

Table II-A lists the secondary vocational programs included in the study, the number of graduates, and the percentage of females and males in each program. Diagram II-B is a bar chart of the number of completers in each of the study's twelve secondary vocational programs. Diagram II-C shows the percentage of females and males in each of the study's programs. Diagrams II-D and II-E compare respectively the 1983 number of completers and percentage of females and males to those in 1982, 1981 and 1980 included in previous studies. Table II-F presents the distribution of the 1983 Secondary Vocational Education graduates by vocational program and training region.

TABLE II-A

STUDY OF 1983 SECONDARY VOCATIONAL EDUCATION GRADUATES BY PROGRAM AND GENDER

VOCATIONAL PROGRAM	NUMBER OF GRADUATES	PERCENTAGE FEMALES	PERCENTAGE MALES
Agricultural Production and Horticulture	408	61.18%	38.82%
Marketing	4,456	57.14	42.86
Health Occupations Education	2,770	92.34	7.66
Home Economics Education	1,218	74.70	25.30
Accounting, Computing and Business Data Processing	3,000	83.40	16.60
General Office Clerical, Stenographic, Secretarial, and Related Occupations	1,539	99.61	0.39
Auto Mechanics	1,309	1.33	98.67
Carpentry	702	1.56	98.44
Electronics	804	5.92	94.08
Machine Shop	1,118	2.16	97.84
Cosmetology	1,132	97.80	2.20
Occupational Work Experience	3,401	29.77	70.23
TOTAL	21,857	57.27%	42.73%

DIAGRAM II-B
Study of 1983 Secondary Vocational Graduates
Number of Completers by Program

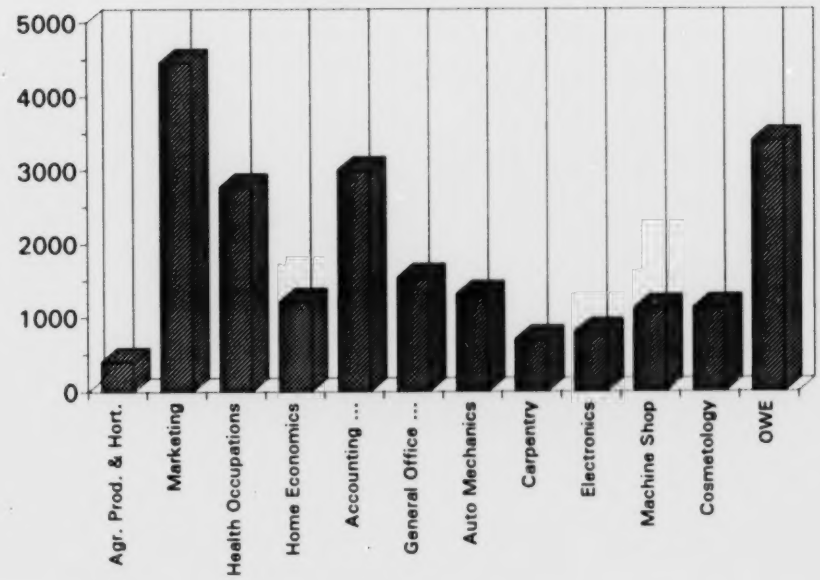

DIAGRAM II-C
Study of 1983 Secondary Vocational Graduates
Percentage of Females and Males by Program

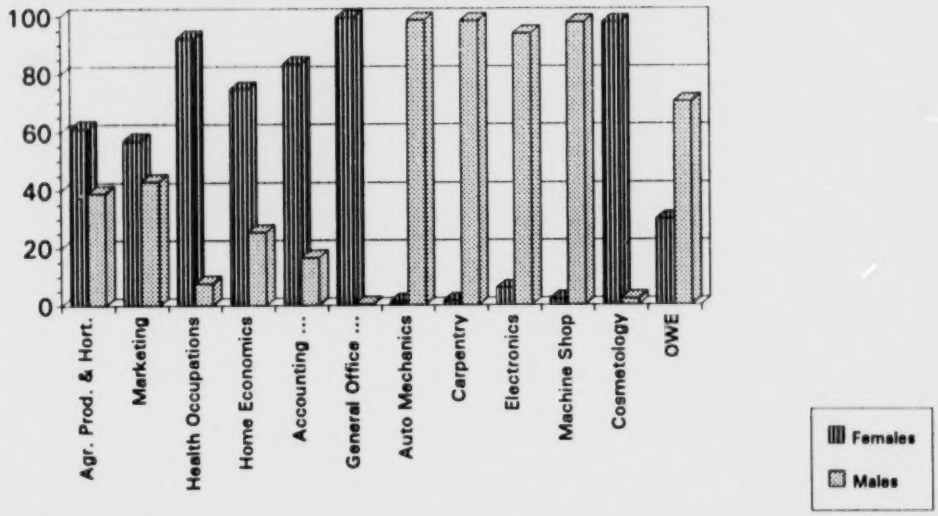

DIAGRAM II-D
Studies of 1980, 1981, 1982 and 1983 Secondary Vocational Graduates
Number of Completers by Program

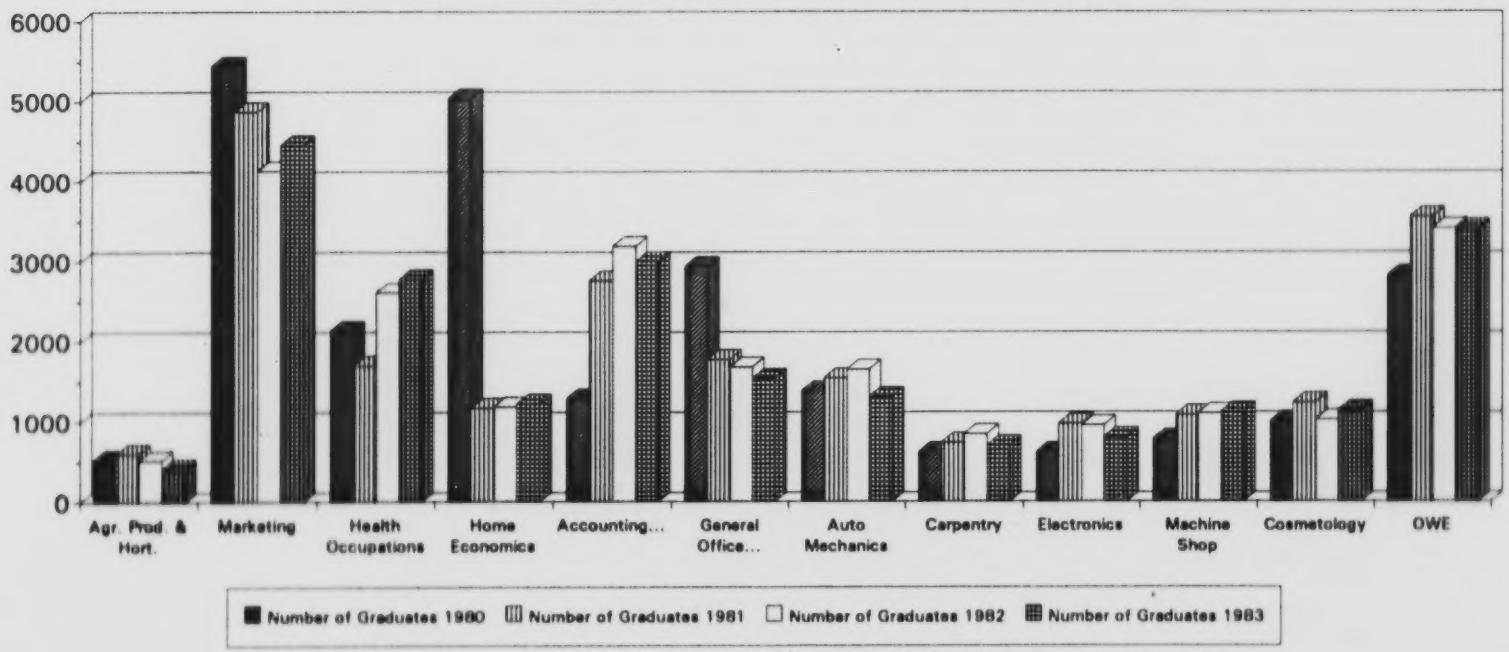

DIAGRAM II-E
Studies of 1980, 1981, 1982 and 1983 Secondary Vocational Graduates
Percentage of Females and Males by Program

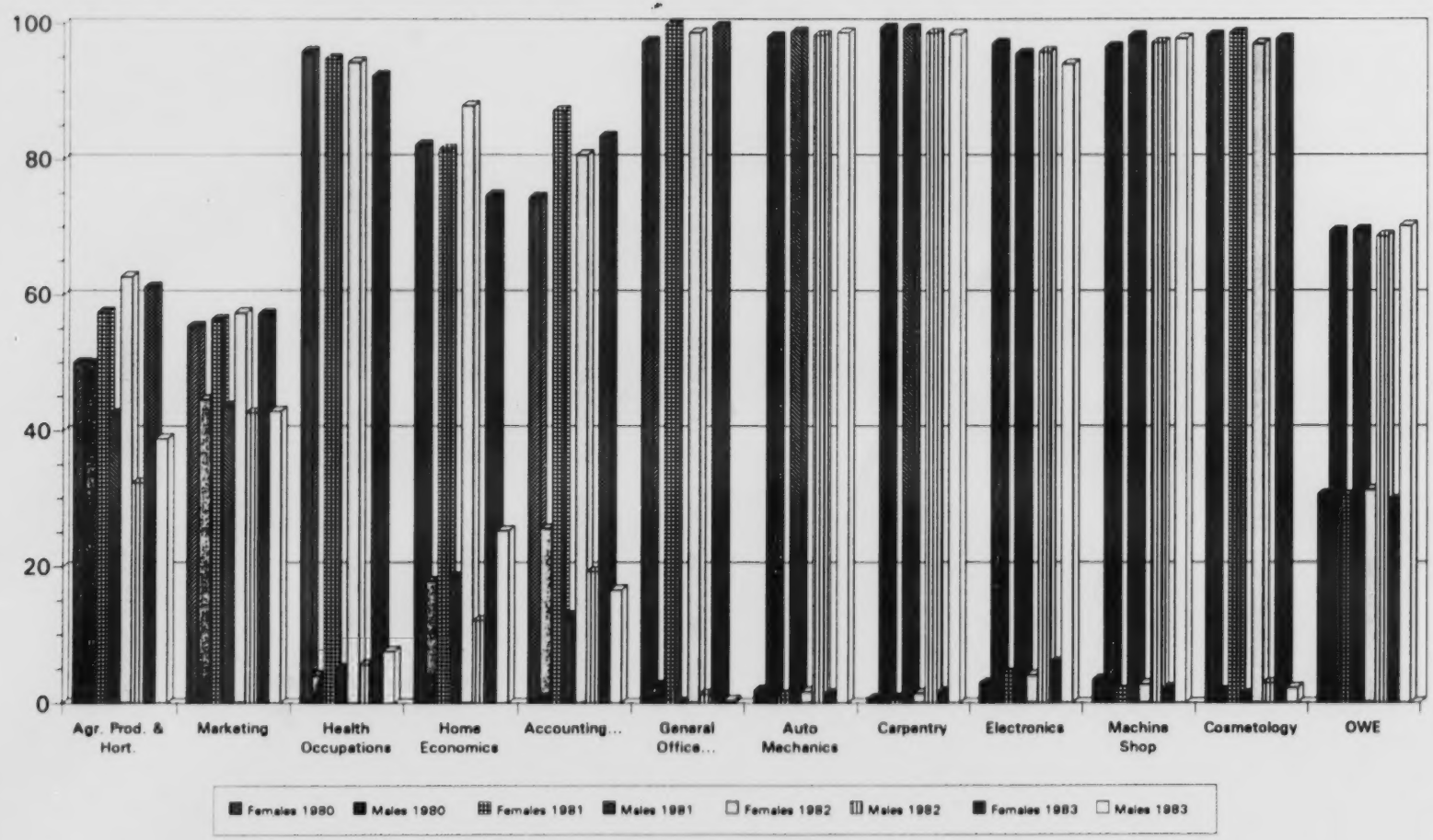

TABLE II-F

STUDY OF 1983 SECONDARY VOCATIONAL GRADUATES
DISTRIBUTION BY VOCATIONAL PROGRAM AND GEOGRAPHICAL REGION

VOCATIONAL EDUCATION PROGRAM	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO	ALL REGIONS
1. Agricultural Production and Horticulture	90	108	27	89	94	408
2. Marketing	506	1,587	396	851	1,116	4,456
3. Health Occupations Education	258	1,104	286	597	525	2,770
4. Home Economics Education	158	412	112	156	380	1,218
5. Accounting, Computing and Business Data Processing	167	1,293	220	714	606	3,000
6. General Office Clerical, Stenographic, Secretarial, and Related Occupations	107	698	83	281	370	1,539
7. Auto Mechanics	29	522	49	368	341	1,309
8. Carpentry	16	172	26	165	323	702
9. Electronics	41	380	61	157	165	804
10. Machine Shop	62	428	61	296	271	1,118
11. Cosmetology	38	408	68	274	344	1,132
12. Occupational Work Experience	77	1,270	287	956	811	3,401
TOTAL	1,549	8,382	1,676	4,904	5,346	21,857

A. INCOME OF 1983 SECONDARY VOCATIONAL GRADUATES: 1987 INCOME TABULATIONS

The data provided by the Internal Revenue Service were used to determine the economic performance of the 1983 Secondary Vocational graduates four years following their graduation.

Tables IIA-1 through IIA-12 present data on the 1987 Tax Year reported income of the 1983 vocational graduates for each of the twelve secondary programs. Reported income is the sum of wages and salaries, interest and dividends, and other income (miscellaneous income from work provided by other than as employees) as reported to the Internal Revenue Service.

Table IIA-6, for example, provides the reported income of those who completed the General Office Clerical, Stenographic, Secretarial and Related Occupations Program. For the entire group of completers, the mean reported income in 1987 was $11,162. Among the group, reported income varied as follows: 19.26% received less than $5,500 (a mean of $2,949), 5.82% between $5,500 and $6,999 (a mean of $6,734), another 7.11% between $7,000 and $8,499 (a mean of $8,305), 8.84% between $8,500 and $9,999 (a mean of $9,986), 13.90% between $10,000 and $11,499 (a mean of $10,824), 13.02% between $11,500 and $12,999 (a mean of $12,598), 11.50% between $13,000 and $14,499 (a mean of $14,295), 7.03% between $14,500 and $15,999 (a mean of $15,502), 8.75% between $16,000 and $18,999 (a mean of $18,546), 2.58% between $19,000 and $21,999 (a mean of $21,098), 0.91% between $22,000 and $23,999 (a mean of $23,789), and 1.28% had an income of at least $24,000 with a mean of $36,458.

The table also shows the distribution of the reported income among the 1983 General Office Clerical, Stenographic, Secretarial and Related Occupations completers who resided outside Ohio in 1987 as compared to those who resided in the state (a mean reported income of $11,809 and $11,097, respectively). The reported incomes of the Ohio residents are then shown by the region of their residence.

A tabulation of the mean reported income by program and region is given in Table IIA-13. Diagram IIA-A is a bar graph of mean reported incomes of completers of each of the twelve secondary vocational programs studied.

TABLE IIA-1
AGRICULTURE PRODUCTION AND HORTICULTURE
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	30.81%	$2,936	17.07%	$2,234	33.33%	$3,039	41.94%	$3,444			39.22%	$2,613	50.00%	$3,793	23.85%	$3,029
$5,500-6,999	11.49	6,883	14.63	5,607	3.35	6,987	12.90	6,886			5.88	6,110			15.38	6,685
$7,000-8,499	10.45	8,274	34.14	8,042	11.72	8,210	9.68	8,254			11.76	7,657	31.25	9,161		
$8,500-9,999	9.49	9,286	7.32	11,421	9.89	8,557	16.12	9,753							10.77	9,051
$10,000-11,499	10.46	11,189			10.26	10,108	9.68	11,427			7.84	10,323			9.23	10,050
$11,500-12,999	5.67	12,389	7.32	13,517	8.52	12,045					7.84	11,675			15.39	11,913
$13,000-14,499	4.88	14,195			4.13	13,533					9.80	14,003				
$14,500-15,999	4.92	15,430			5.49	15,463					11.77	15,695			5.38	14,745
$16,000-18,999	4.58	18,279	9.76	18,707	4.40	16,719									13.07	17,508
$19,000-21,999	2.92	21,491			5.61	20,181					5.89	20,564	18.75	22,011	6.93	22,793
$22,000-23,999	1.26	23,899														
$24,000 and over	3.07	33,648	9.76	25,691	3.30	32,484	9.68	30,031								
TOTAL	100%	$9,565	100%	$10,106	100%	$9,466	100%	$8,717	100%	$8,719	100%	$8,440	100%	$8,886	100%	$10,148

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TABLE IIA-2
MARKETING
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	27.29%	$3,111	20.70%	$2,885	28.41%	$3,162	20.95%	$3,077	35.19%	$3,659	25.22%	$2,999	26.55%	$4,049	27.80%	$3,276
$5,500-6,999	9.73	6,298	15.12	7,316	3.01	6,475	10.13	6,515			8.32	6,410	7.08	6,411	9.76	6,626
$7,000-8,499	9.34	8,198			9.45	7,447	10.13	8,032	9.26	7,878	10.68	7,853	8.00	7,788	18.92	8,821
$8,500-9,999	10.08	9,907	11.39	8,772	10.12	9,389	10.13	9,489					12.39	9,611		
$10,000-11,499	8.89	11,289	11.42	10,165	8.89	10,895	7.43	11,123	14.80	10,139	17.80	10,960	9.73	11,028	8.82	11,005
$11,500-12,999	7.49	12,565	15.73	12,074	8.86	12,385	8.11	12,714	7.41	12,360	7.72	12,414	8.85	12,412	6.64	12,487
$13,000-14,499	5.29	14,023	2.69	14,313	6.72	13,419	14.88	14,783			5.34	14,057	8.00	13,871	5.11	13,970
$14,500-15,999	4.57	15,295			4.98	15,065			9.26	14,805			6.19	15,410	11.75	16,797
$16,000-18,999	6.23	18,636	6.21	16,361	9.74	18,146	4.05	17,228	12.96	18,042	11.87	16,913	8.00	18,250		
$19,000-21,999	3.35	21,208	5.59	20,138	2.21	20,789	3.38	20,782	5.56	21,195	4.75	21,535			3.37	20,534
$22,000-23,999	2.17	23,491	11.15	34,051	2.01	22,313	10.81	32,072					2.65	22,348	7.83	29,793
$24,000 and over	5.57	38,979			5.60	33,517			5.56	34,307	8.30	36,024	2.56	25,126		
TOTAL	100%	$11,164	100%	$12,086	100%	$11,017	100%	$12,004	100%	$11,229	100%	$11,809	100%	$10,273	100%	$10,738

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TABLE IIA-3
HEALTH OCCUPATIONS EDUCATION
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	21.90%	$3,258	20.73%	$2,841	31.50%	$3,721	30.68%	$2,504	24.49%	$2,201	15.27%	$3,400	16.90%	$2,890	21.56%	$3,022
$5,500-6,999	7.42	6,564	11.79	8,124	1.48	6,517	7.95	6,512			1.97	6,483	4.23	6,191	7.88	6,345
$7,000-8,499	7.10	8,221			2.90	8,259	11.36	7,860	10.21	9,312	4.93	8,035	7.04	8,020	7.64	8,040
$8,500-9,999	8.49	9,596	19.92	10,800	7.16	8,878	7.95	9,599			7.88	9,741	8.45	9,268	8.69	9,521
$10,000-11,499	7.98	11,138			6.02	10,872	7.95	10,999	8.16	10,460	10.84	11,167	12.68	10,887	7.08	11,086
$11,500-12,999	7.05	12,364	6.91	12,246	7.45	12,330	11.37	12,962	10.21	12,541	11.33	13,677			7.00	12,495
$13,000-14,499	5.95	14,197	5.28	14,111	6.19	13,671			8.16	14,115			11.27	13,858	5.79	14,171
$14,500-15,999	5.92	15,660	2.85	15,525	4.03	14,785	4.56	15,649	8.16	15,589	6.90	15,477	16.90	17,600	6.60	15,663
$16,000-18,999	10.30	18,456	8.94	17,889	16.26	18,544	13.63	19,620	8.16	17,708	17.24	17,671			9.09	18,015
$19,000-21,999	7.14	21,597	7.72	21,629	3.02	20,763			10.21	21,300	10.84	20,817	12.68	20,994	7.32	21,028
$22,000-23,999	2.98	23,496	5.29	23,516	3.91	23,274	4.55	30,159	6.12	23,246	2.96	23,753			2.90	23,928
$24,000 and over	7.77	32,852	10.57	35,921	10.08	29,704			6.12	27,094	9.84	30,423	9.85	27,329	8.45	30,467
TOTAL	100%	$12,827	100%	$14,042	100%	$12,705	100%	$10,058	100%	$12,748	100%	$14,637	100%	$13,369	100%	$12,552

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TABLE IIA-4
HOME ECONOMICS EDUCATION
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	39.02%	$2,965	33.03%	$3,523	35.78%	$2,328	31.71%	$3,118					54.69%	$3,205	35.12%	$2,964
$5,500-6,999	12.65	6,073	7.34	5,980	11.68	5,827	14.63	6,064	27.27%	$3,716	54.69%	$3,732	13.89	6,331	13.06	6,351
$7,000-8,499	9.92	8,287	5.50	7,073	13.53	7,764	7.32	7,805					8.33	7,314	11.56	7,890
$8,500-9,999	8.17	9,516	5.50	8,996	6.86	9,982	19.51	9,167	45.45	7,110	29.68	9,164			9.64	9,247
$10,000-11,499	7.51	11,222	10.09	10,337	5.08	11,303							16.66	10,201	8.57	10,840
$11,500-12,999	6.15	12,488	11.93	11,652	4.19	12,629	7.32	11,204			6.25	13,676			6.21	12,459
$13,000-14,499	3.78	14,269			7.11	13,050							11.11	12,917	3.85	13,852
$14,500-15,999	3.15	15,614	8.26	14,480	7.11	15,383	9.76	14,329	27.28	14,271						
$16,000-18,999	4.33	18,459			6.02	16,652							8.53	15,815	7.06	16,279
$19,000-21,999	2.06	21,227	10.09	17,813	0.89	21,126	9.75	18,678			9.38	20,613			3.43	20,516
$22,000-23,999	1.15	23,189														
$24,000 and over	2.11	31,905	8.26	27,900	1.75	25,975									1.50	23,413
TOTAL	100%	$8,343	100%	$10,217	100%	$8,019	100%	$8,275	100%	$8,138	100%	$7,555	100%	$7,302	100%	$8,118

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TABLE IIA-5
ACCOUNTING, COMPUTING AND BUSINESS DATA PROCESSING
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	25.81%	$3,197	24.28%	$3,188	21.10%	$2,726	24.04%	$2,755	19.35%	$2,675	19.37%	$3,112	18.07%	$2,216	26.92%	$3,124
$5,500-6,999	6.94	6,600	6.16	6,504	6.59	6,414	3.85	6,587	9.68	6,156	6.34	6,084	7.23	6,316	6.82	6,640
$7,000-8,499	8.28	8,292	6.88	8,038	8.45	8,083	5.77	7,986			5.63	7,661			9.98	8,246
$8,500-9,999	8.93	9,799	9.42	9,807	9.69	9,560	18.27	10,638	9.68	8,588	11.97	8,976	4.82	8,560	8.54	9,851
$10,000-11,499	9.05	11,298	11.23	11,248	8.83	11,147					9.15	10,400	6.02	10,239	9.48	11,411
$11,500-12,999	10.33	12,792	10.87	12,516	9.95	12,717	19.23	12,270	9.68	12,236	10.21	11,821	16.87	11,501	9.55	13,060
$13,000-14,499	8.63	14,437	10.87	14,192	8.23	14,359	11.54	13,915	19.35	14,311	11.26	13,306	14.46	13,261		
$14,500-15,999	5.99	15,758	10.15	16,887	8.10	14,589					15.84	15,946	6.02	14,501	7.11	14,574
$16,000-18,999	6.73	18,196			10.40	16,956	14.42	16,047	22.58	17,648			8.43	16,020	12.42	17,366
$19,000-21,999	4.01	21,634	3.62	21,738	1.01	19,012	2.88	20,691			3.87	19,651	18.08	19,296	3.88	21,953
$22,000-23,999	1.59	23,198			7.65	23,689			9.68	22,352	6.34	27,286			5.30	30,674
$24,000 and over	3.71	32,947	6.52	36,481												
TOTAL	100%	$11,061	100%	$11,697	100%	$10,988	100%	$10,195	100%	$12,047	100%	$11,167	100%	$11,456	100%	$10,958

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TABLE IIA-6
GENERAL OFFICE CLERICAL, STENOGRAPHIC, SECRETARIAL AND RELATED OCCUPATIONS
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	19.26%	$2,949	24.17%	$2,623	19.41%	$2,986	14.29%	$2,622	45.45%	$5,471	16.68%	$4,040	16.33%	$3,517	19.73%	$3,230
$5,500-6,999	5.82	6,734	4.17	6,341	5.98	6,866					7.97	6,564	8.16	6,491	5.77	6,587
$7,000-8,499	7.11	8,305	5.00	8,156	7.23	8,428	11.90	7,630			8.70	8,299			6.00	8,067
$8,500-9,999	8.84	9,986	5.00	9,705	9.22	9,995	11.90	9,809			8.70	9,608	8.16	8,583	10.20	9,761
$10,000-11,499	13.90	10,824	12.50	11,069	5.01	10,419	9.52	10,988			11.59	11,210	12.24	10,492	13.69	11,218
$11,500-12,999	13.02	12,598	24.16	13,420	13.84	12,472	7.14	12,548	27.27	13,441	11.59	12,811	16.33	12,784	14.50	12,871
$13,000-14,499	11.50	14,295			11.47	14,345	23.82	14,315			14.49	14,433	8.16	14,389	10.60	14,428
$14,500-15,999	7.03	15,502	15.00	16,859	3.50	14,829			27.28	17,706	17.39	16,849			14.90	16,377
$16,000-18,999	8.75	18,546			21.19	16,759	21.43	17,675					30.62	17,480		
$19,000-21,999	2.58	21,098	5.83	21,330	3.15	19,441					2.89	22,306			2.19	21,654
$22,000-23,999	0.91	23,789	4.17	38,840											2.42	28,001
$24,000 and over	1.28	36,458														
TOTAL	100%	$11,162	100%	$11,809	100%	$11,097	100%	$11,589	100%	$10,982	100%	$11,205	100%	$11,703	100%	$11,020

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TABLE IIA-7
AUTO MECHANICS
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	16.80%	$3,431	6.04%	$5,820	11.12%	$3,612	11.90%	$2,308			19.01%	$2,934	34.38%	$3,769	17.93%	$3,643
$5,500-6,999	5.89	6,850	4.03	6,649	7.36	6,873					4.23	6,544			7.26	6,420
$7,000-8,499	7.55	8,159	2.68	7,893	11.43	8,321	9.52	7,977			5.63	7,995	15.63	9,060	8.44	8,244
$8,500-9,999	8.58	9,420	10.07	9,787	6.12	8,912	5.95	9,986			6.34	9,702			16.15	10,652
$10,000-11,499	10.85	11,274	26.85	11,261	10.37	11,268	10.71	11,475			11.27	11,042				
$11,500-12,999	9.64	12,495	14.77	12,740	9.33	12,236	11.90	12,882			9.15	12,434			8.74	12,755
$13,000-14,499	8.93	14,156	10.74	14,118	8.45	14,313	10.71	14,489			8.45	14,114	15.63	14,239	8.89	14,318
$14,500-15,999	7.25	15,563	5.37	15,606	8.46	14,825	9.52	15,787			24.64	16,870			17.92	17,267
$16,000-18,999	11.60	18,445	10.74	18,474	17.78	17,941	15.48	18,508					18.75	18,210		
$19,000-21,999	5.89	21,776	4.69	21,871	2.31	21,890	8.33	21,899			5.63	21,581	15.61	30,608	6.96	21,046
$22,000-23,999	2.94	23,165			3.04	22,731					5.65	27,575			7.71	27,426
$24,000 and over	4.08	34,863	4.02	30,830	4.23	25,910	5.98	27,642								
TOTAL	100%	$12,750	100%	$13,325	100%	$12,660	100%	$13,787	100%	$12,946	100%	$12,404	100%	$13,130	100%	$12,597

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TABLE IIA-8
CARPENTRY
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	16.44%	$3,849	19.05%	$4,027	14.72%	$3,664	18.60%	$3,949			14.29%	$1,381	17.65%	$5,630	15.66%	$3,531
$5,500-6,999	6.49	6,894	3.81	6,904	5.95	6,881					17.86	6,881			7.14	6,799
$7,000-8,499	7.60	7,995	3.81	8,346	7.06	7,077	6.98	8,172					17.65	8,871	14.29	8,935
$8,500-9,999	7.52	9,412	14.29	9,998	14.30	9,336	11.63	9,924								
$10,000-11,499	12.76	11,156	17.14	11,194	4.35	11,005	9.30	11,664			10.71	10,709	17.65	11,091	11.26	11,393
$11,500-12,999	9.12	12,317	13.33	12,895	5.29	11,878					10.71	12,509				
$13,000-14,499	9.09	13,909	6.67	14,490	6.29	13,581	20.93	13,722					29.41	15,438	8.24	13,210
$14,500-15,999	7.12	15,675	12.38	17,357	9.07	15,174					14.29	16,111			10.43	14,582
$16,000-18,999	9.82	18,621			17.75	18,987	9.30	16,407							18.41	17,456
$19,000-21,999	6.88	21,795	5.71	21,518	4.19	21,980	6.98	19,533			17.86	19,065	17.64	20,357	6.88	21,471
$22,000-23,999	2.00	23,991	3.81	32,876	3.26	22,737	6.98	22,184							7.69	31,224
$24,000 and over	5.16	33,895			7.77	28,997	9.30	29,923			14.28	32,500				
TOTAL	100%	$12,880	100%	$12,011	100%	$13,406	100%	$13,636	100%	$15,150	100%	$14,261	100%	$12,648	100%	$13,299

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TABLE IIA-9
ELECTRONICS
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	14.91%	$3,447	4.13%	$2,509	12.93%	$3,457	13.79%	$2,076	37.50%	$3,212	16.25%	$3,555	16.00%	$1,439	19.73%	$3,540
$5,500-6,999	5.46	6,842	5.52	6,575	6.70	6,728					10.00	6,881	20.00	7,215	8.00	6,614
$7,000-8,499	7.13	8,343	8.27	8,138	6.52	8,496	17.25	7,310			8.75	9,100			6.13	8,318
$8,500-9,999	12.31	9,134	12.41	9,456	1.06	8,975							16.00	9,381	10.93	9,997
$10,000-11,499	11.46	10,976	17.93	11,042	10.59	10,154	13.79	10,090			5.00	10,120			11.20	11,449
$11,500-12,999	12.24	12,677	24.14	12,937	13.76	12,130					20.00	11,772	16.00	11,983	10.13	12,999
$13,000-14,499	7.36	14,240			14.10	13,641	13.79	13,560	62.50	21,431					5.07	14,481
$14,500-15,999	5.87	15,695	4.14	15,282	5.46	15,986					12.50	15,674			7.73	15,893
$16,000-18,999	6.53	17,791	7.59	17,821	10.05	16,000	10.34	17,076					12.00	20,269	5.87	18,673
$19,000-21,999	5.33	21,688	6.21	20,978	5.00	21,876	17.25	22,573			5.00	21,540			5.60	21,674
$22,000-23,999	1.85	23,695	9.66	36,346	2.01	22,010							20.00	40,012	2.13	23,997
$24,000 and over	9.55	37,851			11.82	28,722	13.79	31,299			22.50	35,659			7.48	35,549
TOTAL	100%	$13,756	100%	$14,215	100%	$13,627	100%	$14,784	100%	$14,599	100%	$15,982	100%	$15,526	100%	$12,872

1983 Vocational Education Graduates in 1987: A Study Based on Federal Income Tax Data
by I.A. Ghazalah, Ohio University

TABLE IIA-10
MACHINE SHOP
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	11.22%	$3,463	10.56%	$2,935	10.30%	$3,515	8.75%	$1,737	33.33%	$4,476	9.24%	$2,909	9.62%	$1,701	15.39%	$3,929
$5,500-6,999	6.49	6,355	4.93	6,703	5.01	5,580	5.00	6,918			4.20	6,378	7.69	6,981	6.31	6,943
$7,000-8,499	5.18	8,028	3.52	8,143	5.77	7,162					5.88	8,255	7.69	8,924	4.82	8,379
$8,500-9,999	6.25	9,185	23.24	10,572	5.03	8,677	6.25	10,469	22.22	11,430	5.88	10,005			4.82	9,966
$10,000-11,499	5.65	11,488			6.71	10,262							7.69	10,823	4.64	11,400
$11,500-12,999	9.00	12,307	15.49	12,874	2.71	12,956	6.25	12,823			4.20	11,848	9.62	13,423	7.79	12,997
$13,000-14,499	9.27	14,178	9.86	14,452	7.19	13,560	8.75	13,996			7.56	13,470			8.91	14,489
$14,500-15,999	7.34	15,328	14.08	18,133	8.95	14,502	10.00	15,278			7.56	14,905	19.23	15,029	6.68	15,939
$16,000-18,999	12.48	18,343	9.86	21,658	13.02	18,297	16.25	18,030	27.78	18,993	24.37	17,902	25.00	17,797	12.06	18,843
$19,000-21,999	8.91	21,284			7.15	19,021	15.00	21,405					7.69	23,812	7.98	21,972
$22,000-23,999	4.99	23,600			10.01	22,001	23.75	29,760	16.67	36,486	9.24	22,005			5.57	23,797
$24,000 and over	13.22	32,433	8.46	28,392	18.15	30,645					21.87	29,558	5.77	44,087	15.03	32,359
TOTAL	100%	$15,638	100%	$13,894	100%	$16,311	100%	$17,915	100%	$15,390	100%	$17,113	100%	$15,224	100%	$16,039

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by I.A. Ghazalah, Ohio University

TABLE IIA-11
COSMETOLOGY
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	40.87%	$2,918	43.05%	$2,350	42.16%	$2,982	42.22%	$2,840			32.00%	$3,528			37.20%	$2,835
$5,500-6,999	11.11	6,891	9.72	5,781	10.23	6,984					15.00	6,415	43.75%	$3,178	11.80	6,380
$7,000-8,499	9.24	8,263	18.07	7,680	9.08	8,397	17.77	7,132					9.37	7,326	9.40	7,683
$8,500-9,999	12.07	9,460	9.72	9,820	7.07	9,057	13.33	9,412			27.00	8,537	9.37	9,137		
$10,000-11,499	9.37	11,273			8.77	10,172	11.12	11,490			7.00	10,678			23.77	10,217
$11,500-12,999	5.31	12,479	8.33	11,728	8.05	11,651					6.00	12,282	15.64	11,359	5.20	12,226
$13,000-14,499	4.33	14,316			3.62	13,256	8.89	12,868							4.70	13,796
$14,500-15,999	2.58	15,581	6.94	14,160	3.48	15,056					8.00	14,528	9.37	14,011		
$16,000-18,999	2.64	18,084			3.73	17,902									5.21	16,585
$19,000-21,999	1.20	21,695			1.51	21,500					5.00	17,773	12.50	18,339		
$22,000-23,999	1.28	33,437			1.28	22,533	6.67	24,639							2.72	21,099
$24,000 and over			4.17	40,849	1.02	29,804										
TOTAL	100%	$7,770	100%	$7,579	100%	$7,793	100%	$7,786	100%	$8,799	100%	$7,931	100%	$8,315	100%	$7,680

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TABLE IIA-12
OCCUPATIONAL WORK EXPERIENCE
1983 SECONDARY VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	32.07%	$3,647	19.51%	$2,668	28.00%	$2,645	28.17%	$3,586	22.78%	$2,659	24.30%	$4,330	23.33%	$3,296	31.46%	$3,001
$5,500-6,999	8.99	6,993	6.18	6,403	8.16	6,979	19.72	7,235	13.89	6,488	10.76	6,294	16.67	5,970	9.90	6,184
$7,000-8,499	9.64	8,483	5.79	8,079	5.10	8,476					21.91	8,453	16.67	8,499	10.75	7,656
$8,500-9,999	9.16	9,398	12.80	9,496	17.08	9,183	11.27	8,985	16.66	9,901			10.00	10,755	8.80	9,080
$10,000-11,499	10.19	10,740	19.82	10,505	2.12	11,300					9.16	10,669			8.80	10,653
$11,500-12,999	7.48	12,191	11.58	12,156	8.16	11,715	12.68	11,987	11.11	12,623	6.77	12,069	13.33	12,314	6.66	12,035
$13,000-14,499	5.10	14,261	4.88	13,637	10.67	13,895	5.63	13,594			6.77	13,609			5.68	13,476
$14,500-15,999	4.60	15,899	3.35	15,229	4.97	14,501	5.63	14,941	11.11	15,935	4.78	14,803			11.12	16,057
$16,000-18,999	5.63	18,097	6.40	17,535	9.13	16,001	7.04	18,764			13.15	18,418	20.00	19,749		
$19,000-21,999	3.58	21,557	6.01	21,210	1.05	19,123			11.11	20,220					3.54	19,999
$22,000-23,999	1.24	23,291			3.33	22,001	9.86	28,577	8.33	22,036	2.40	27,264			3.29	42,419
$24,000 and over	2.32	38,108	3.68	39,698	2.23	26,636										
TOTAL	100%	$9,898	100%	$11,122	100%	$9,698	100%	$10,715	100%	$10,412	100%	$10,081	100%	$9,848	100%	$9,572

1983 Vocational Education Graduates in 1987: A Study Based on Federal Income Tax Data
by I.A. Ghazalah, Ohio University

TABLE IIA-13

MEAN REPORTED INCOME OF 1983 SECONDARY VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM AND REGION (1987 TAX YEAR)

VOCATIONAL EDUCATION PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
1. Agricultural Production and Horticulture	$9,565	$10,106	$9,466	$8,717	$8,719	$8,440	$8,886	$10,148
2. Marketing	11,164	12,086	11,017	12,004	11,229	11,809	10,273	10,738
3. Health Occupations Education	12,827	14,042	12,705	10,058	12,748	14,637	13,369	12,552
4. Home Economics Education	8,342	10,217	18,019	8,275	8,138	7,555	7,302	8,118
5. Accounting, Computing and Business Data Processing	11,061	11,697	10,988	10,195	12,047	11,167	11,456	10,958
6. General Office Clerical, Stenographic, Secretarial, and Related Occupations	11,162	11,809	11,097	11,589	10,982	11,205	11,703	11,020
7. Auto Mechanics	12,750	13,325	12,660	13,787	12,946	12,404	13,130	12,597
8. Carpentry	12,880	12,011	13,406	13,636	15,150	14,261	12,648	13,299
9. Electronics	13,756	14,215	3,627	14,784	14,599	15,982	15,526	12,872
10. Machine Shop	15,638	13,894	16,311	17,915	15,390	17,113	15,224	16,039
11. Cosmetology	7,770	7,579	7,793	7,786	8,799	7,931	8,315	7,680
12. Occupational Work Experience	9,898	11,122	9,698	10,715	10,412	10,081	9,848	9,572

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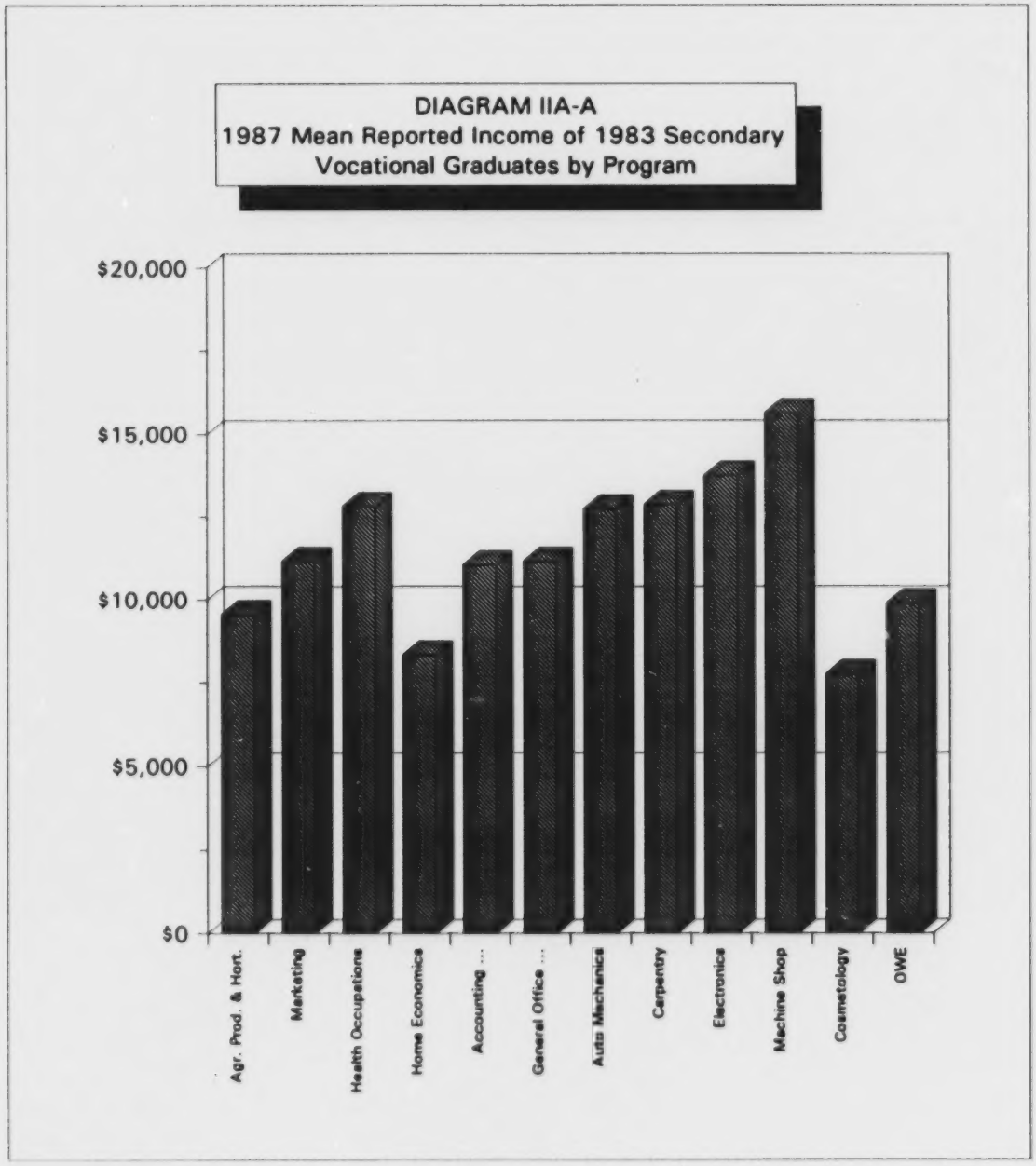


DIAGRAM IIA-A
1987 Mean Reported Income of 1983 Secondary Vocational Graduates by Program
$20,000
$15,000
$10,000
$5,000
$0
Agr. Prod. & Hort.
Marketing
Health Occupations
Home Economics
Accounting ...
General Office ...
Auto Mechanics
Carpentry
Electronics
Machine Shop
Cosmetology
OWE

B. GEOGRAPHIC MOBILITY OF 1983 SECONDARY VOCATIONAL GRADUATES

The mobility patterns of Secondary Vocational graduates can be analyzed by comparing their residence in 1987 to that of 1983, the year in which they completed their programs.

Each vocational graduate was identified by the zip code of the school attended in 1983. Using the geographical regional classification of the State based on zip codes, we were able to determine for each vocational program the number of graduates who resided in each of the five regions of the State of Ohio (Central, Northeast, Northwest, Southwest and Balance of Ohio) in 1987.

The group data on vocational graduates provided by the Internal Revenue Service for 1987 were classified by the same geographical regions within the State as well as a sixth region, out-of-state, for each of the vocational programs. We were thus able to trace the net mobility of the Secondary Vocational graduates between 1983 and 1987.

For each of the vocational programs, the State's retention rate was obtained by calculating the percentage of the total number of the 1983 graduates who in 1987 resided in any of the Ohio regions. Table IIB-1 shows the retention rate for each of the twelve Secondary Vocational programs as well as for all of these programs combined. The retention rate of all twelve secondary programs is 85.42%, indicating that 14.58% of the 1983 graduates of these programs were out-of-state residents in 1987. The table also compares these retention rates to those for the 1982, 1981 and 1980 Secondary Vocational graduates in 1986, 1985 and 1984, respectively. Diagram IIB-A is a bar chart of these data in chronological order.

It should be noted that net retention rates are calculated on the basis of residence. Therefore, retention by the State included those who resided in Ohio but worked out of state and did not include out-of-state residents whose work place was in Ohio.

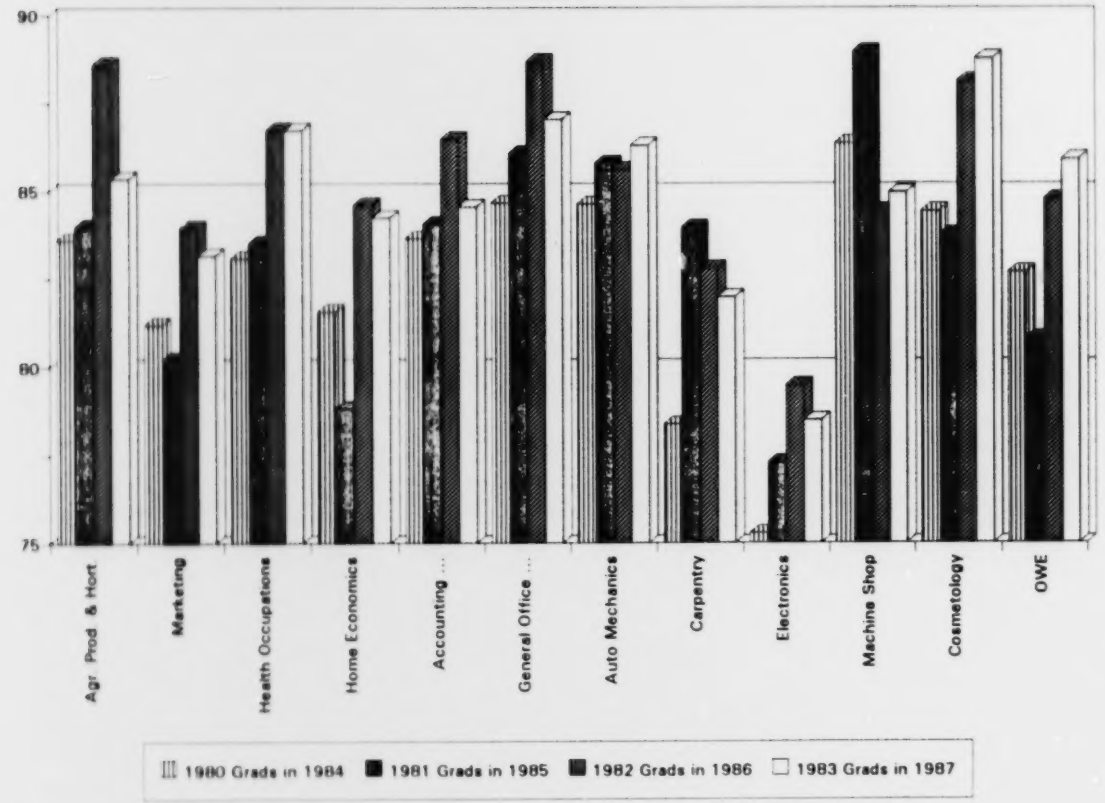
TABLE IIB-1

STATE RETENTION RATES OF 1983, 1982, 1981 AND 1980 SECONDARY VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM

VOCATIONAL PROGRAM	Percent of 1983 Graduates Who Maintained Residence in Ohio in 1987	Percent of 1982 Graduates Who Maintained Residence in Ohio in 1986	Percent of 1981 Graduates Who Maintained Residence in Ohio in 1985	Percent of 1980 Graduates Who Maintained Residence in Ohio in 1984
Agricultural Production and Horticulture	85.35%	88.58%	83.98%	83.61%
Marketing	83.17%	83.95%	80.19%	81.18%
Health Occupations Education	86.72%	86.73%	83.50%	83.08%
Home Economics Education	84.24%	84.60%	78.81%	81.57%
Accounting, Computing and Business Data Processing	84.55%	86.48%	84.06%	83.65%
General Office Clerical, Stenographic, Secretarial, and Related Occupations	87.03%	88.68%	86.07%	84.67%
Auto Mechanics	86.31%	85.61%	85.80%	84.64%
Carpentry	81.99%	82.81%	83.97%	78.37%
Electronics	78.49%	79.49%	77.30%	75.28%
Machine Shop	84.96%	84.43%	88.95%	86.37%
Cosmetology	88.76%	88.12%	83.77%	84.43%
Occupational Work Experience	85.90%	84.76%	80.81%	82.69%
TOTAL	85.42%	84.46%	83.22%	82.50%

DIAGRAM IIB-A

State Retention Rates of 1980, 1981, 1982 and 1983 Secondary Vocational Graduates by Vocational Program



C. INCOME OF 1983 SECONDARY VOCATIONAL GRADUATES: COMPARISON WITH EQUIVALENT GROUPS

Income data on the 1983 graduates of secondary vocational programs for the 1987 Tax Year may be analyzed using baseline data on a comparable group, i.e., one with the same age bracket and educational achievement.

The U.S. Bureau of the Census data on 1987 money income of persons in the United States[1] can be used as a baseline with appropriate adjustments for the U.S. – Ohio and Ohio-regional income relatives. In 1987, earnings in the United States of males in the 18-24 age group with four years of high school education had a mean of $10,039. The equivalent figure for females was $7,274.

In order to carry out the comparison between earnings of graduates of vocational programs in the study and those of the comparable group in the general population, the following procedures were utilized:

1. For each of the twelve secondary vocational programs, a U.S. basic comparison figure of earnings was calculated using the gender breakdown of graduates (See Table II-A) as weights. For example, the basic 1987 U.S. comparison figure of $8,459 for graduates of Marketing was calculated by multiplying 0.5714 (the proportion of females) times $7,274 (the female earnings figure) and adding the result to that of multiplying 0.4286 (the proportion of males) times $10,039 (the male earnings figure).
2. Bureau of the Census money income data for the applicable age groups and years of schooling are nationwide data. Therefore, in order to provide an appropriate comparison of money incomes of vocational graduates to earners in the general population within the State of Ohio and within the five regions of the State, the money income data by program and region were adjusted using income relatives between the U.S. and Ohio and between the U.S. and each of Ohio's five geographical regions. The income relative for each region was calculated using a

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[1] U.S. Department of Commerce, Bureau of the Census, Money Income of Households, Families and Persons in the United States: 1987, Series P-60, No. 159.

population-weighted average of income relatives of component counties based on 1987 per capita income estimates for Ohio counties.[2] Each 1987 mean reported income figure for the 1983 Secondary Vocational graduates included in the study (See Table IIA-13) was then divided by the ratio of the applicable income level for the region (or the State as a whole) to that of the U.S.

3. Each of these adjusted reported income figures for Secondary Vocational graduates was then divided by the 1987 money income applicable to the program as described in 1 above.

The results are shown in Table IIC-1. The ratios of the mean incomes in 1987 of the 1983 Secondary Vocational graduates to the 1987 incomes of the comparable group (the same age bracket, educational achievement and geographic region) are listed by vocational program and region. The Carpentry Program can be used to illustrate the results. For all 1983 graduates of the program, the ratio of 1.35 indicates that the mean 1987 income was 35% higher than the 1987 mean income for the comparable group by age and educational achievement. For those completers of the program who resided outside Ohio, the ratio of 1.20 indicates they received a mean income 20% higher than the 1987 mean for the comparable group by age and educational achievement. For all 1983 graduates who lived in Ohio, the mean income was 41% higher than the comparable group in Ohio. The remaining ratios of 1.35, 1.54, 1.49, 1.24 and 1.54 indicate a higher percentage mean income of 35%, 54%, 49%, 24%, and 54% for those who resided in Central Ohio, Northeast Ohio, Northwest Ohio, Southwest Ohio, and Balance of Ohio, respectively.

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[2] U.S. Department of Commerce, Bureau of the Census, East North Central 1988 Population and 1987 Per Capita Income Estimates for Counties and Incorporated Places, Series P-26, No. 87-ENC-SC.

TABLE IIC-1

RATIOS OF MEAN REPORTED INCOME OF 1983 SECONDARY VOCATIONAL GRADUATES TO MEAN GENERAL INCOME BY VOCATIONAL PROGRAM AND REGION (1987 TAX YEAR)

VOCATIONAL EDUCATION PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
1. Agricultural Production and Horticulture	1.20	1.21	1.19	1.04	1.06	1.05	1.04	1.40
2. Marketing	1.38	1.42	1.37	1.41	1.35	1.45	1.19	1.47
3. Health Occupations Education	1.79	1.88	1.79	0.99	1.73	2.04	1.75	1.94
4. Home Economics Education	1.10	1.28	1.06	1.03	1.04	1.01	0.98	1.18
5. Accounting, Computing and Business Data Processing	1.50	1.51	1.50	1.31	1.58	1.50	1.45	1.64
6. General Office Clerical, Stenographic, Secretarial, and Related Occupations	1.60	1.62	1.60	1.58	1.53	1.60	1.57	1.75
7. Auto Mechanics	1.33	1.33	1.33	1.37	1.31	1.29	1.28	1.45
8. Carpentry	1.35	1.20	1.41	1.35	1.54	1.49	1.24	1.54
9. Electronics	1.45	1.44	1.45	1.49	1.50	1.68	1.54	1.49
10. Machine Shop	1.64	1.39	1.72	1.78	1.57	1.79	1.49	1.86
11. Cosmetology	1.11	1.03	1.12	1.05	1.22	1.13	1.11	1.21
12. Occupational Work Experience	1.12	1.21	1.11	1.15	1.15	1.14	1.05	1.20

D. INCOME OF 1983, 1982, 1981 AND 1980 SECONDARY VOCATIONAL GRADUATES FOUR YEARS FOLLOWING THEIR GRADUATION: A COMPARISON

The study has focused on 1987, which marks four years following the graduation of the 1983 Secondary Vocational graduates. The purpose of this section is to compare the mean incomes in 1987 of the 1983 vocational graduates with those of the 1982, 1981 and 1980 vocational graduates in 1986, 1985 and 1984. The four groups of vocational education graduates will be compared at the same point in their respective working paths four years after their graduation. Tables IID-1, IID-2, IID-3 and IID-4 show the mean income by vocational program and region for each of these four groups of vocational education graduates at the same point in their respective working path four years after their vocational graduation, i.e., in 1987, 1986, 1985 and 1984 for the graduates in 1983, 1982, 1981, and 1980, respectively. Table IID-5 and Diagram IID-A provide a comparison of their mean incomes.

TABLE IID-1

MEAN REPORTED INCOME OF 1983 SECONDARY VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM AND REGION (1987 TAX YEAR)

VOCATIONAL EDUCATION PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
Agricultural Production and Horticulture	$9,565	$10,106	$9,466	$8,717	$8,719	$8,440	$8,886	$10,148
Marketing	11,164	12,086	11,017	12,004	11,229	11,809	10,273	10,738
Health Occupations Education	12,827	14,042	12,705	10,058	12,748	14,637	13,369	12,552
Home Economics Education	8,342	10,217	18,019	8,275	8,138	7,555	7,302	8,118
Accounting, Computing and Business Data Processing	11,061	11,697	10,988	10,195	12,047	11,167	11,456	10,958
General Office Clerical, Stenographic, Secretarial, and Related Occupations	11,162	11,809	11,097	11,589	10,982	11,205	11,703	11,020
Auto Mechanics	12,750	13,325	12,660	13,787	12,946	12,404	13,130	12,597
Carpentry	12,880	12,011	13,406	13,636	15,150	14,261	12,648	13,299
Electronics	13,756	14,215	13,627	14,784	14,599	15,982	15,526	12,872
Machine Shop	15,638	13,894	16,311	17,915	15,390	17,113	15,224	16,039
Cosmetology	7,770	7,579	7,793	7,786	8,799	7,931	8,315	7,680
Occupational Work Experience	9,898	11,122	9,698	10,715	10,412	10,081	9,848	9,572

TABLE IID-2

MEAN INCOME OF 1982 SECONDARY VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM AND REGION (1986 TAX YEAR)

VOCATIONAL EDUCATION PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
Agricultural Production and Horticulture	$11,662	$13,015	$11,390	$11,993	$10,817	$12,241	$11,877	$11,002
Marketing	$12,455	$12,207	$12,502	$12,977	$13,096	$12,236	$12,512	$12,131
Health Occupations Education	$11,687	$12,234	$11,605	$10,010	$12,141	$12,446	$12,697	$11,215
Home Economics Education	$8,167	$9,933	$7,795	$7,099	$8,294	$7,913	$7,038	$8,102
Accounting, Computing and Business Data Processing	$11,987	$12,577	$11,819	$12,084	$12,094	$10,988	$12,632	$11,609
General Office Clerical, Stenographic, Secretarial, and Related Occupations	$10,849	$11,167	$10,779	$9,216	$10,892	$9,250	$10,718	$10,127
Auto Mechanics	$13,975	$13,888	$13,989	$13,840	$13,599	$13,231	$15,485	$13,704
Carpentry	$13,867	$14,992	$13,634	$14,148	$13,935	$12,316	$14,012	$13,336
Electronics	$13,569	$14,048	$13,315	$15,578	$14,769	$13,426	$12,898	$12,747
Machine Shop	$15,714	$13,572	$16,115	$15,278	$15,383	$16,188	$16,014	$15,673
Cosmetology	$8,378	$9,729	$8,320	$8,264	$8,995	$8,125	$8,772	$8,076
Occupational Work Experience	$10,243	$12,054	$9,852	$10,040	$9,988	$9,299	$9,394	$9,137

TABLE IID-3

MEAN INCOME OF 1981 SECONDARY VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM AND REGION (1985 TAX YEAR)

VOCATIONAL EDUCATION PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
Agricultural Production and Horticulture	$10,185	$8,594	$10,873	$9,979	$11,547	$9,288	$10,920	$11,193
Marketing	$10,399	$9,743	$10,752	$10,392	$11,700	$9,467	$9,352	$10,370
Health Occupations Education	$11,179	$9,396	$11,890	$10,003	$13,254	$11,758	$12,020	$10,821
Home Economics Education	$8,165	$8,063	$8,455	$8,142	$8,141	$8,599	$7,879	$8,683
Accounting, Computing and Business Data Processing	$10,557	$8,677	$10,252	$9,828	$10,774	$10,524	$11,402	$10,892
General Office Clerical, Stenographic, Secretarial, and Related Occupations	$10,449	$10,007	$10,825	$10,616	$11,086	$10,540	$11,857	$10,701
Auto Mechanics	$12,921	$11,446	$13,332	$12,297	$13,491	$12,904	$14,418	$12,923
Carpentry	$12,865	$11,622	$13,261	$12,370	$13,512	$12,406	$12,513	$13,933
Electronics	$12,613	$12,135	$12,944	$14,223	$13,541	$12,765	$13,251	$11,503
Machine Shop	$14,454	$13,868	$14,698	$13,923	$16,328	$13,683	$15,807	$13,844
Cosmetology	$7,919	$6,986	$8,855	$7,434	$8,626	$8,109	$9,166	$7,796
Occupational Work Experience	$9,633	$9,250	$10,194	$9,706	$11,009	$9,313	$10,537	$9,036

TABLE IID-4

MEAN INCOME OF 1980 SECONDARY VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM AND REGION (1984 TAX YEAR)

VOCATIONAL EDUCATION PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
Agricultural Production and Horticulture	$9,565	$12,352	$8,609	$7,675	$10,310	$8,073	$9,017	$11,193
Marketing	$9,944	$10,709	$9,764	$10,595	$8,872	$9,942	$12,247	$9,505
Health Occupations Education	$10,744	$10,722	$10,564	$9,783	$11,647	$11,086	$11,218	$10,443
Home Economics Education	$8,147	$9,259	$7,900	$8,362	$10,193	$7,944	$6,918	$7,671
Accounting, Computing and Business Data Processing	$10,373	$9,345	$10,479	$9,326	$12,124	$12,299	$11,180	$10,273
General Office Clerical, Stenographic, Secretarial, and Related Occupations	$9,954	$9,612	$10,014	$8,300	$11,029	$9,743	$10,077	$10,099
Auto Mechanics	$12,222	$11,291	$12,369	$11,449	$15,788	$14,744	$15,549	$11,852
Carpentry	$11,898	$11,828	$11,850	$11,845	$14,969	$13,749	$12,167	$11,608
Electronics	$12,496	$13,133	$12,289	$13,864	$16,579	$12,566	$13,030	$11,993
Machine Shop	$13,685	$12,589	$13,833	$16,311	$17,716	$14,226	$16,448	$13,224
Cosmetology	$7,785	$7,325	$7,764	$6,578	$5,646	$6,893	$11,206	$7,803
Occupational Work Experience	$9,168	$10,091	$8,951	$9,865	$10,947	$8,912	$8,548	$8,869

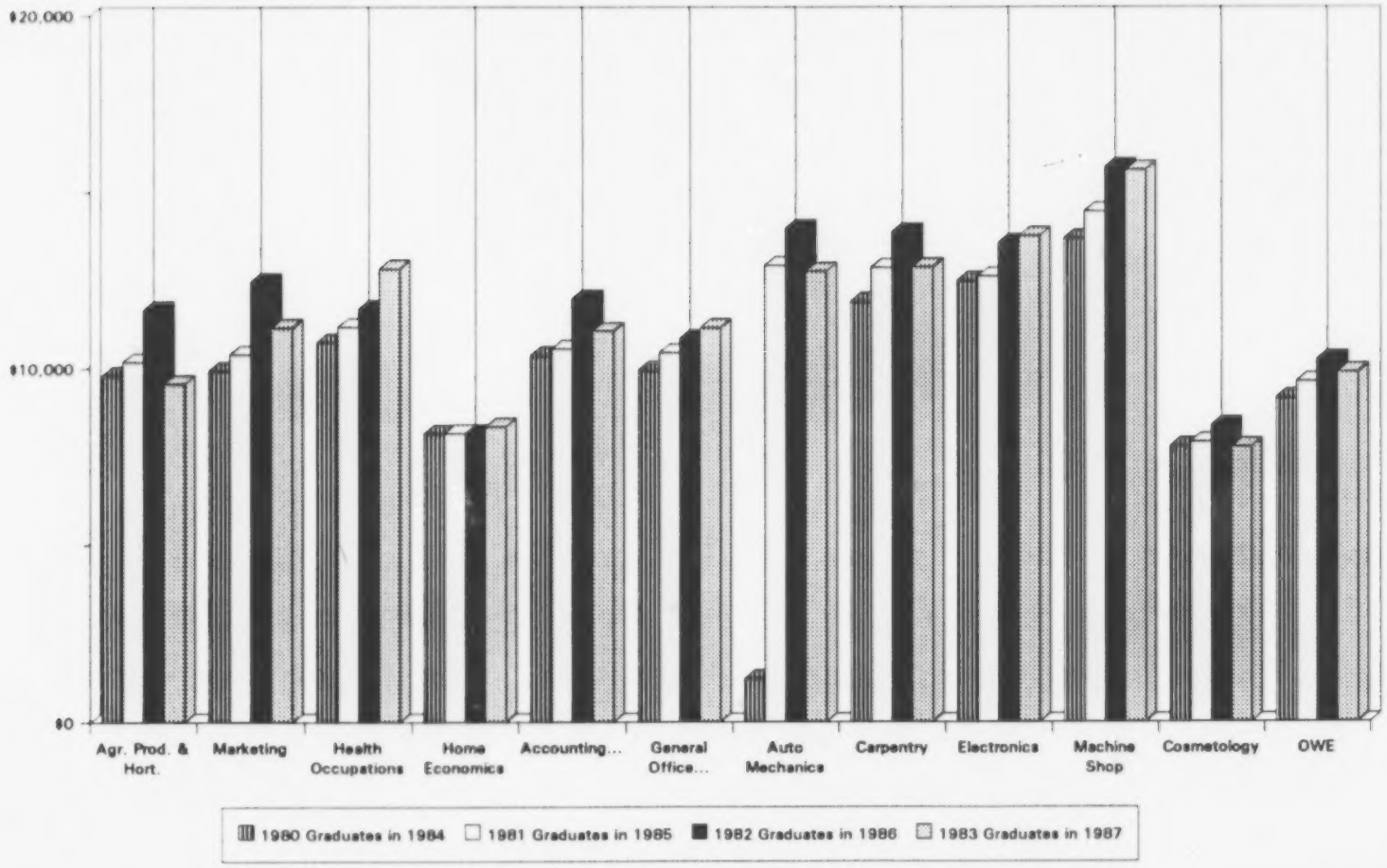
TABLE IID-5

MEAN INCOME OF 1983, 1982, 1981 AND 1980 SECONDARY VOCATIONAL EDUCATION GRADUATES FOUR YEARS AFTER GRADUATION BY VOCATIONAL PROGRAM

VOCATIONAL PROGRAM	Mean Income in 1987 of 1983 Secondary Vocational Graduates	Mean Income in 1986 of 1982 Secondary Vocational Graduates	Mean Income in 1985 of 1981 Secondary Vocational Graduates	Mean Income in 1984 of 1980 Secondary Vocational Graduates
Agricultural Production and Horticulture	$9,565	$11,662	$10,185	$9,799
Marketing	$11,164	$12,455	$10,399	$9,944
Health Occupations Education	$12,827	$11,687	$11,179	$10,744
Home Economics Education	$8,342	$8,167	$8,165	$8,147
Accounting, Computing and Business Data Processing	$11,061	$11,987	$10,557	$10,373
General Office Clerical, Stenographic, Secretarial, and Related Occupations	$11,162	$10,849	$10,449	$9,954
Auto Mechanics	$12,750	$13,975	$12,921	$12,222
Carpentry	$12,880	$13,867	$12,865	$11,898
Electronics	$13,756	$13,569	$12,613	$12,496
Machine Shop	$15,638	$15,714	$14,454	$13,685
Cosmetology	$7,770	$8,378	$7,919	$7,785
Occupational Work Experience	$9,898	$10,243	$9,633	$9,168

DIAGRAM IID-A

Mean Income of 1980, 1981, 1982 and 1983 Secondary Vocational Graduates by Program



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E. INCOME OF 1983, 1982, 1981 AND 1980 SECONDARY VOCATIONAL GRADUATES FOUR YEARS FOLLOWING GRADUATION: COMPARISON WITH EQUIVALENT GROUPS

A final comparison between the income performance of the 1983, 1982, 1981 and 1980 vocational graduates was conducted by reference to the comparable group in the general population.

Table IIE-1 shows the ratios of mean incomes in 1987 of the 1983 Secondary Vocational graduates to the 1987 mean income of the comparable group in the general population (the same age bracket, educational achievement and geographic region) by vocational program and region.

Table IIE-2 and Diagram IIE-A show the ratios of mean incomes of Secondary Vocational graduates (by program) to the mean incomes of comparable groups for the 1983, 1982, 1981 and 1980 completers in 1987, 1986, 1985 and 1984, respectively. This provides a comparison of the ratios of mean incomes to the mean incomes of comparable groups at the same point in the career path of the four groups of vocational graduates, i.e. four years after completion of their programs.

TABLE IIE-1

RATIOS OF MEAN REPORTED INCOME OF 1983 SECONDARY VOCATIONAL GRADUATES TO MEAN GENERAL INCOME BY VOCATIONAL PROGRAM AND REGION (1987 TAX YEAR)

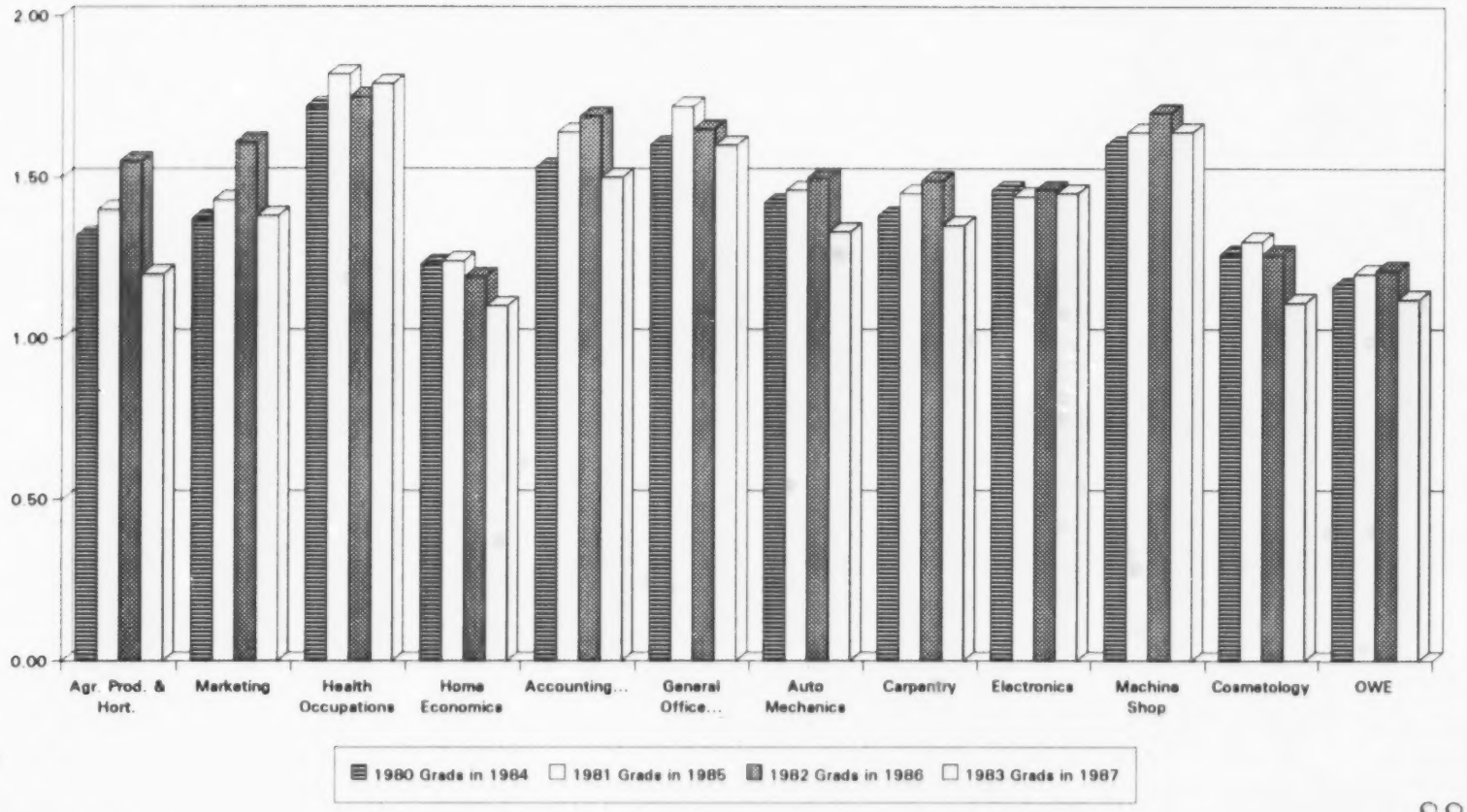
VOCATIONAL EDUCATION PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
1. Agricultural Production and Horticulture	1.20	1.21	1.19	1.04	1.06	1.05	1.04	1.40
2. Marketing	1.38	1.42	1.37	1.41	1.35	1.45	1.19	1.47
3. Health Occupations Education	1.79	1.88	1.79	0.99	1.73	2.04	1.75	1.94
4. Home Economics Education	1.10	1.28	1.06	1.03	1.04	1.01	0.99	1.18
5. Accounting, Computing and Business Data Processing	1.50	1.51	1.50	1.31	1.58	1.50	1.45	1.64
6. General Office Clerical, Stenographic, Secretarial, and Related Occupations	1.60	1.62	1.60	1.58	1.53	1.60	1.57	1.75
7. Auto Mechanics	1.33	1.33	1.33	1.37	1.31	1.29	1.28	1.45
8. Carpentry	1.35	1.20	1.41	1.35	1.54	1.49	1.24	1.54
9. Electronics	1.45	1.44	1.45	1.49	1.50	1.68	1.54	1.49
10. Machine Shop	1.64	1.39	1.72	1.78	1.57	1.79	1.49	1.86
11. Cosmetology	1.11	1.03	1.12	1.05	1.22	1.13	1.11	1.21
12. Occupational Work Experience	1.12	1.21	1.11	1.15	1.15	1.14	1.05	1.20

TABLE IIE-2

RATIOS OF MEAN INCOMES OF 1983, 1982, 1981 AND 1980 SECONDARY VOCATIONAL GRADUATES TO MEAN INCOME OF COMPARABLE GROUPS IN GENERAL POPULATION BY VOCATIONAL PROGRAM

VOCATIONAL PROGRAM	1987 Mean Income of 1983 Secondary Vocational Graduates/ Mean Income of Comparable Groups	1986 Mean Income of 1982 Secondary Vocational Graduates/ Mean Income of Comparable Groups	1985 Mean Income of 1981 Secondary Vocational Graduates/ Mean Income of Comparable Groups	1984 Mean Income of 1980 Secondary Vocational Graduates/ Mean Income of Comparable Groups
Agricultural Production and Horticulture	1.20	1.55	1.40	1.32
Marketing	1.38	1.61	1.43	1.37
Health Occupations Education	1.79	1.75	1.82	1.72
Home Economics Education	1.10	1.19	1.24	1.23
Accounting, Computing and Business Data Processing	1.50	1.69	1.64	1.53
General Office Clerical, Stenographic, Secretarial, and Related Occupations	1.60	1.65	1.72	1.60
Auto Mechanics	1.33	1.50	1.46	1.42
Carpentry	1.35	1.49	1.45	1.38
Electronics	1.45	1.46	1.44	1.46
Machine Shop	1.64	1.70	1.64	1.60
Cosmetology	1.11	1.26	1.30	1.26
Occupational Work Experience	1.12	1.21	1.20	1.16

DIAGRAM IIE-A
Ratios of Mean Income of 1980, 1981, 1982 and 1983 Secondary Vocational Graduates
To Mean Income of Comparable Groups in General Population
by Program



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CHAPTER III

THE 1983 ASSOCIATE VOCATIONAL EDUCATION GRADUATES

CHAPTER III

THE 1983 ASSOCIATE VOCATIONAL EDUCATION GRADUATES

The study utilized federal income tax records for the 1983 graduates of two Associate Vocational Education programs or combinations of programs in the State of Ohio. In this chapter, we will report on and analyze the earnings and geographic mobility of the 1983 Associate Vocational graduates in 1987, four years following their graduation. The performance in 1987 of the 1983 Associate Vocational graduates will be compared with that of the 1982, 1981 and 1980 Associate Vocational graduates in 1986, 1985 and 1984, respectively.

Table III-A provides information on the 1,643 graduates of the two programs studied. It lists the programs, the number of graduates, and the percentage of females and males in each program. Table III-B presents the distribution of the 1983 Associate completers by vocational program and geographical training region.

TABLE III-A

STUDY OF 1983 ASSOCIATE VOCATIONAL GRADUATES
DISTRIBUTION BY PROGRAM AND GENDER

VOCATIONAL PROGRAM	NUMBER OF GRADUATES	PERCENTAGE FEMALES	PERCENTAGE MALES
Health Occupations Education	759	93.99%	6.01%
Technical Education	884	8.24%	91.76%
TOTAL	1,643	47.84%	52.16%

TABLE III-B

STUDY OF 1983 ASSOCIATE VOCATIONAL GRADUATES
DISTRIBUTION BY VOCATIONAL PROGRAM AND GEOGRAPHIC REGION

VOCATIONAL PROGRAM	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO	ALL REGIONS
Health Occupations Education	96	295	305	17	46	759
Technical Education	48	89	155	433	159	884
TOTAL	144	384	460	450	205	1,643

A. INCOME OF 1983 ASSOCIATE VOCATIONAL GRADUATES: 1987 INCOME TABULATIONS

The data provided by Internal Revenue Service were used to determine the economic performance of the 1983 Associate Vocational graduates four years following their graduation.

Tables IIIA-1 and IIIA-2 present data on the 1987 Tax Year reported income of the 1983 Associate Vocational graduates for each of the two programs. Reported income is the sum of wages and salaries, income from interest and dividends, and other income (miscellaneous income from work provided by other than as employees) as reported to the Internal Revenue Service.

Table IIIA-2, for example, provides the reported income data of those who completed the Technical Education program. For the entire group of graduates, the mean reported income in 1987 was $22,546. Among the group, reported income varied as follows: 6.12% received less than $5,500 (a mean of $3,253); 3.06% between $5,500 and $6,999 (a mean of $6,586); another 2.36% between $7,000 and $8,499 (a mean of $8,187); 3.67% between $8,500 and $9,999 (a mean of $9,482); 3.74% between $10,000 and $11,499 (a mean of $11,063); 3.28% between $11,500 and $12,999 (a mean of $12,355); 4.67% between $13,000 and $14,499 (a mean of $14,174); 6.09% between $14,500 and $15,999 (a mean of $15,486); 10.32% between $16,000 and $18,999 (a mean of $18,366); 12.17% between $19,000 and $21,999 (a mean of $21,285); 9.42% between $22,000 and $23,999 (a mean of $23,287); and 35.10% had a reported income of at least $24,000 with a mean of $35,615.

The table also shows a distribution of reported income for those among the Associate graduates of 1983 who resided outside the State of Ohio in 1987 as compared to those who resided in the state (a mean income of $24,295 and $22,390 respectively). The reported incomes of the Ohio residents are then shown by the region of their residence (Central Ohio, Northeast Ohio, Northwest Ohio, Southwest Ohio and Balance of Ohio).

A tabulation of mean reported income by program and region is given in Table IIIA-3.

TABLE IIIA-1
HEALTH OCCUPATIONS EDUCATION
1983 ASSOCIATE VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean	Outside Ohio Percent/Ohio	All Ohio Percent/Mean	Central Ohio Percent/Mean	Northeast Ohio Percent/Mean	Northwest Ohio Percent/Mean	Southwest Ohio Percent/Mean	Balance of Ohio Percent/Mean
Under $5,500	4.99% $3,298	6.67% $4,593	4.74% $2,285		7.41% $6,090	6.25% $6,470	8.33% $2,435	3.83% $3,175
$5,500-6,999	1.79 6,411	5.56 7,575	1.96 5,222					2.06 6,684
$7,000-8,499	1.31 8,260		0.65 7,805					0.89 7,950
$8,500-9,999	1.80 9,457	6.67 11,259				7.81 10,896		1.48 10,088
$10,000-11,499	2.78 11,189		1.96 10,998					
$11,500-12,999	2.82 12,475	4.44 14,191	2.46 11,684		12.35 14,307	4.69 14,062	8.33 13,136	1.77 11,694
$13,000-14,499	3.37 14,089		3.76 13,568					2.95 13,581
$14,500-15,999	4.03 15,294	8.89 17,885	3.11 14,998		27.16 18,990	4.69 15,897	27.79 20,405	2.06 14,739
$16,000-18,999	12.81 18,179		12.60 17,885			12.50 18,403		3.83 16,857
$19,000-21,999	12.72 21,694	67.77 30,400	12.93 21,156		22.22 22,850	9.38 21,915		26.55 20,562
$22,000-23,999	11.91 23,578		3.03 22,580			54.68 31,386	55.55 28,225	54.58 29,496
$24,000 and over	39.67 33,667		52.80 30,378		30.86 32,148			
TOTAL	100% $23,563	100% $24,301	100% $23,454	100% $21,244	100% $22,374	100% $24,178	100% $22,647	100% $23,594

1983 Vocational Education Graduates in 1987: A Study Based on Federal Income Tax Data
by I.A. Ghazalah, Ohio University

TABLE IIIA-2
TECHNICAL EDUCATION
1983 ASSOCIATE VOCATIONAL COMPLETERS
REPORTED INCOME
(1987 TAX YEAR)

Size of Reported Income	All Regions Percent/Mean		Outside Ohio Percent/Ohio		All Ohio Percent/Mean		Central Ohio Percent/Mean		Northeast Ohio Percent/Mean		Northwest Ohio Percent/Mean		Southwest Ohio Percent/Mean		Balance of Ohio Percent/Mean	
Under $5,500	6.12%	$3,253	4.19%	$2,742	7.98%	$2,792	8.16%	$2,284							8.42%	$3,563
$5,500-6,999	3.06	6,586	1.80	6,462	5.88	6,495							11.11%	$6,756	2.61	6,989
$7,000-8,499	2.36	8,187	2.40	8,111	1.20	7,050	8.16	7,546							2.61	8,255
$8,500-9,999	3.67	9,482	4.19	9,878	3.78	8,968										
$10,000-11,499	3.74	11,063			3.91	11,304									3.81	10,591
$11,500-12,999	3.28	12,355	8.38	12,180	3.47	12,699	6.12	12,365							3.41	11,615
$13,000-14,499	4.67	14,174			1.10	13,558									3.21	13,680
$14,500-15,999	6.09	15,486	4.19	15,207	17.75	15,406	10.20	15,936	16.67%	$15,226					5.01	15,043
$16,000-18,999	10.32	18,366	8.38	16,900	11.89	18,697			16.67	18,693	20.00%	$16,351	29.63	17,985	16.63	18,489
$19,000-21,999	12.17	21,285			2.10	21,889	16.33	19,124								
$22,000-23,999	9.42	23,287	11.38	22,083	0.90	22,001	12.25	23,132							13.43	22,548
$24,000 and over	35.10	35,615	55.09	32,435	40.04	36,750	38.78	34,286	66.66	29,601	80.00	29,352	59.26	30,774	40.86	31,631
TOTAL	100%	$22,546	100%	$24,295	100%	$22,390	100%	$22,437	100%	$25,386	100%	$26,752	100%	$24,316	100%	$21,718

1983 Vocational Education Graduates in 1987: A Study Based on Federal Income Tax Data
by I.A. Ghazalah, Ohio University

TABLE IIIA-3

MEAN INCOME OF 1983 ASSOCIATE VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM AND REGION (1987 TAX YEAR)

VOCATIONAL PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
Health Occupations Education	$23,563	$24,301	$23,454	$21,244	$22,374	$24,178	$22,647	$23,594
Technical Education	$22,546	$24,295	$22,390	$22,437	$25,386	$26,752	$24,316	$21,718

B. GEOGRAPHIC MOBILITY OF 1983 ASSOCIATE VOCATIONAL GRADUATES

The mobility patterns of Associate Vocational graduates can be analyzed by comparing their residence in 1987 to that of 1983, the year in which they completed their programs.

Each vocational graduate was identified by the zip code of the school attended in 1983. Using the geographical regional classification of the State based on zip codes, we were able to determine for each vocational program the number of graduates who resided in each of the five regions of the State of Ohio (Central, Northeast, Northwest, Southwest and Balance of Ohio).

The group data on vocational graduates provided by the Internal Revenue Service for 1987 were classified by the same geographical regions within the State as well as a sixth region, out-of-state, for each of the vocational programs. We were thus able to trace the mobility of the Associate Vocational graduates between 1983 and 1987.

For each of the vocational programs, the State's retention rate was obtained by calculating the percentage of the total number of the 1983 graduates who in 1987 resided in any of the five Ohio regions. Table IIIB-1 shows the net retention rate for each of the two Associate Vocational programs as well as for both programs combined. The retention rate of both associate programs is 81.73%, indicating that 18.27% of the 1983 graduates of both programs were out-of-state residents in 1987. The retention rate was 79.92% for Technical Education, and 84.24% for Health Occupations Education. The retention rates are also shown for the 1982, 1981 and 1980 Associate Vocational graduates in 1986, 1985 and 1984, respectively. Diagram IIIB-A is a bar graph of the retention rates by program of the four chronological groups of graduates.

It should be noted that net retention rates are calculated on basis of residence. Therefore, retention by the State included those who resided in Ohio but worked out of state and did not include out-of-state residents whose work place was in Ohio.

TABLE IIIB-1

STATE RETENTION RATES OF 1983, 1982, 1981 AND 1980 ASSOCIATE VOCATIONAL GRADUATES BY VOCATIONAL PROGRAM

VOCATIONAL PROGRAM	Percent of 1983 Graduates Who Maintained Residence in Ohio in 1987	Percent of 1982 Graduates Who Maintained Residence in Ohio in 1986	Percent of 1981 Graduates Who Maintained Residence in Ohio in 1985	Percent of 1980 Graduates Who Maintained Residence in Ohio in 1984
Health Occupations Education	84.24%	84.46%	77.94%	79.80%
Technical Education	79.92%	77.44%	76.40%	71.97%
TOTAL	81.73%	78.82%	77.02%	75.91%

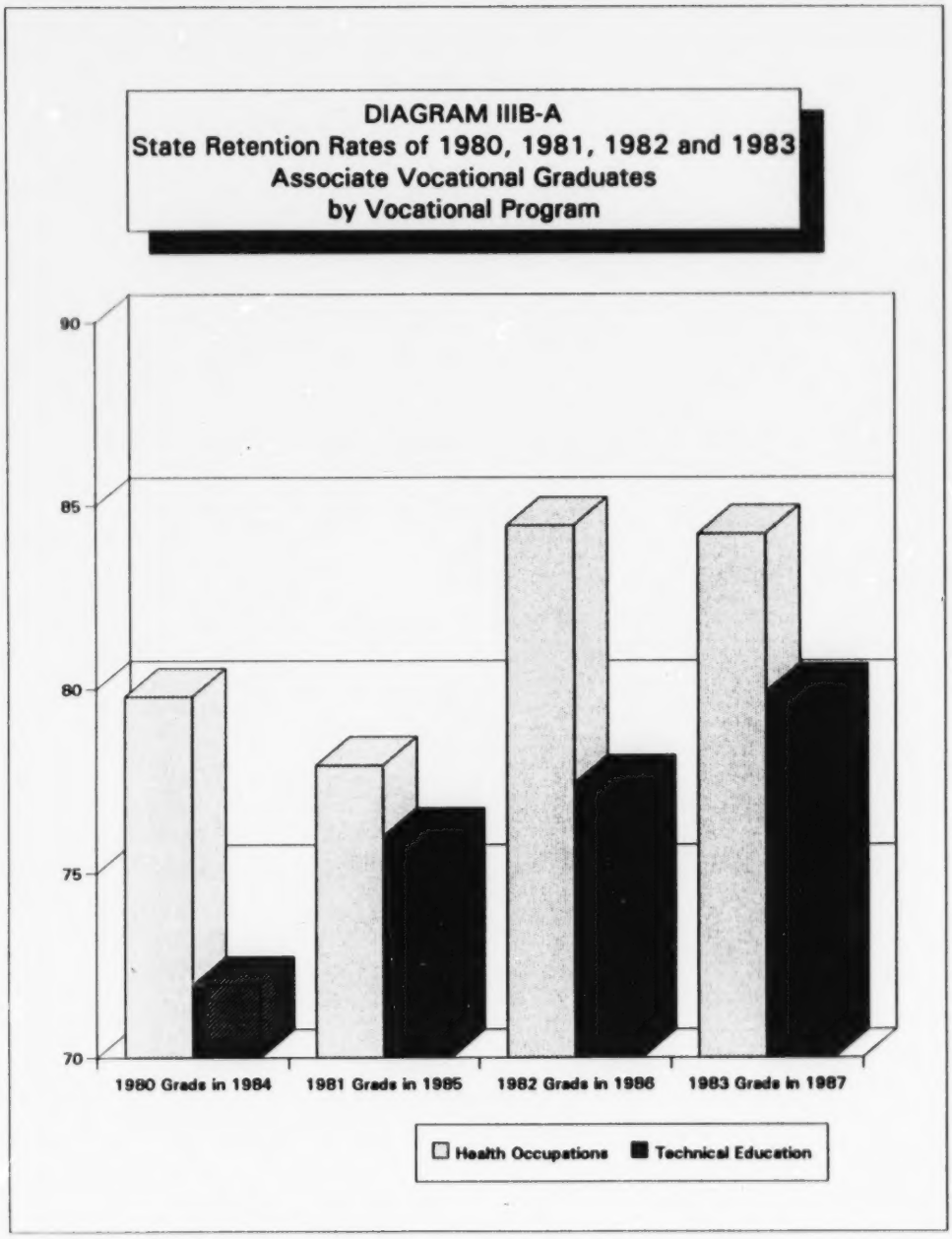
DIAGRAM IIIB-A
State Retention Rates of 1980, 1981, 1982 and 1983
Associate Vocational Graduates
by Vocational Program
90
85
80
75
70
1980 Grads in 1984
1981 Grads in 1985
1982 Grads in 1986
1983 Grads in 1987
Health Occupations
Technical Education

C. INCOME OF 1983 ASSOCIATE VOCATIONAL GRADUATES: COMPARISON WITH EQUIVALENT GROUPS

The 1987 income data on the 1983 Associate Vocational graduates may be analyzed using baseline data on a comparable group, i.e., one with the same age bracket and educational achievement.

The U.S. Bureau of the Census data on 1987 money income of persons in the United States[3] can be used as a baseline with appropriate adjustments for the U.S.-Ohio and Ohio-regional income relatives. In 1987, earnings in the United States for those in the 25-34 age group with 1-3 years of college education[4] was $14,200 for females and $21,992 for males.

In order to carry out the comparison between earnings of graduates of associate vocational programs in our study and those of the comparable group in the general population, we utilized the following procedure:

1. For each of the two Associate Vocational programs, a U.S. basic comparison figure of earnings was calculated using the gender breakdown of program completers (See Table III-A) as weights. For example, the basic 1987 U.S. figure of $14,668 for Health Occupations Education was calculated by multiplying 0.9399 (the proportion of females) times 14,200 (the female earnings figure) and adding the result to that of multiplying 0.0601 (the proportion of males) times 21,992 (the male earnings figure).
2. Bureau of the Census money income data for the applicable age group and years of schooling are nationwide data. Therefore, in order to provide an appropriate comparison of money incomes of vocational graduates to earners in the general population within the State of Ohio and within the five regions of the State, the money income data by program and region were adjusted

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[3] U.S. Department of Commerce, Bureau of the Census, Money Income of Households, Families, and Persons in the United States: 1987, Series P-60.

[4] The median age of the 1983 associate degree graduates in Ohio was 30 years in 1987. This estimate was based on the Ohio Board of Regents' 1983 Student Inventory Data Enrollment in Ohio's Institutions of Higher Education: Two Year Centers.

using income relatives between the United States and Ohio, and between the United States and each of Ohio's five geographical regions. The income relative for each region was calculated using a population-weighted average of income relatives of component counties based on 1987 per capita income estimates for Ohio counties.[5]

Each 1987 mean reported income figure for the 1983 Associate Vocational graduates (Table IIIA-3) was then divided by the applicable income ratio relative for the regions (or the State as a whole) to that of the U.S.

3. Each of these adjusted reported income figures was then divided by the 1987 mean income applicable to the program as described in 1 above.

The results are shown in Table IIIC-1. The ratios of the 1987 mean incomes of the 1983 Associate Vocational graduates to the 1987 mean incomes of the comparable group (the same age bracket, educational achievement and geographic region) are listed by vocational program and region. The Health Occupations program can be used to illustrate the results. For all 1983 graduates of the program, the ratio of 1.68 indicates that the mean 1987 income was 68% higher than the 1987 mean income for the comparable group by age and educational achievement. For those completers of the program who resided outside Ohio, the ratio of 1.65 indicates they received a mean income 65% higher than the 1987 mean income of the comparable group. For all 1983 graduates who lived in Ohio, the mean income was 68% higher than the comparable group in Ohio. The remaining ratios of 1.44, 1.54, 1.71, 1.51 and 1.85 indicate a higher percentage mean income of 44%, 54%, 71%, 51% and 85% for those who resided in Central Ohio, Northeast Ohio, Northwest Ohio, Southwest Ohio and Balance of Ohio, respectively. Diagram IIIC-A is a bar chart of the ratios of mean income of Associate Vocational graduates to mean general income by program and region.

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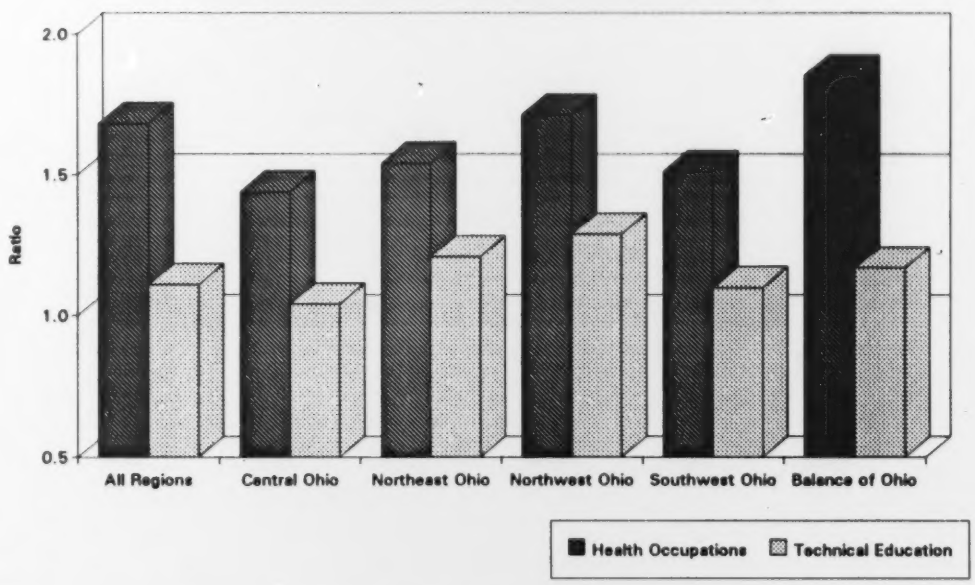
[5] U.S. Department of Commerce, Bureau of the Census, East North Central 1988 Population and 1987 Per Capita Income Estimates for Counties and Incorporated Places, Series P-26, No. 87-ENC-SC.

TABLE IIIC-1

RATIOS OF MEAN INCOME OF 1983 ASSOCIATE VOCATIONAL GRADUATES TO MEAN GENERAL INCOME BY VOCATIONAL PROGRAM AND REGION (1987 TAX YEAR)

VOCATIONAL PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
Health Occupations Education	1.68	1.65	1.68	1.44	1.54	1.71	1.51	1.85
Technical Education	1.11	1.13	1.11	1.04	1.21	1.29	1.10	1.17

DIAGRAM IIIC-A
Ratios of Mean Income of 1983 Associate Vocational Graduates To Mean General Income By Program and Region (1987 Tax Year)



D. INCOME OF 1983, 1982, 1981 AND 1980 ASSOCIATE VOCATIONAL GRADUATES FOUR YEARS FOLLOWING THEIR GRADUATION: A COMPARISON

The study has focused on 1987, which marks four years following the graduation of the 1983 Associate Vocational graduates. The purpose of this section is to compare the mean income in 1987 of the 1983 vocational graduates with the mean incomes of the 1982, 1981 and 1980 vocational graduates in 1986, 1985 and 1984, respectively. The groups of vocational education graduates will be compared at the same point in their respective working paths four years after their graduation.

Table IIID-1 shows the mean income by vocational program and region of 1983 Associate Vocational graduates in 1987 and the mean income of 1982, 1981 and 1980 graduates in 1986, 1985 and 1985, respectively.

TABLE IIID-1

MEAN INCOME OF 1983, 1982, 1981 AND 1980 ASSOCIATE VOCATIONAL EDUCATION GRADUATES BY VOCATIONAL PROGRAM AND REGION

VOCATIONAL PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
HEALTH OCCUPATIONS EDUCATION								
1983 Graduates in 1987	$23,563	$24,301	$23,454	$21,244	$22,374	$24,178	$22,647	$23,594
1982 Graduates in 1986	$20,357	$21,295	$20,194	$19,141	$20,460	$21,950	$20,288	$19,794
1981 Graduates in 1985	$19,971	$20,521	$19,787	$17,613	$20,015	$20,330	$19,893	$19,982
1980 Graduates in 1984	$16,203	$17,403	$15,909	$14,683	$17,564	$16,477	$16,809	$15,654
TECHNICAL EDUCATION								
1983 Graduates in 1987	$22,546	$24,295	$22,390	$22,437	$25,386	$26,752	$24,316	$21,718
1982 Graduates in 1986	$23,067	$22,572	$23,005	$23,748	$24,425	$23,254	$22,191	$21,714
1981 Graduates in 1985	$20,758	$18,415	$21,114	$20,309	$21,351	$21,884	$20,013	$20,659
1980 Graduates in 1984	$19,218	$18,303	$19,441	$20,403	$19,657	$21,052	$21,446	$19,160

E. INCOME OF 1983, 1982, 1981 AND 1980 ASSOCIATE VOCATIONAL GRADUATES FOUR YEARS FOLLOWING THEIR GRADUATION: COMPARISON WITH EQUIVALENT GROUPS

A final comparison between the income performance of the 1983, 1982, 1981 and 1980 vocational graduates was conducted by reference to the comparable group in the general population.

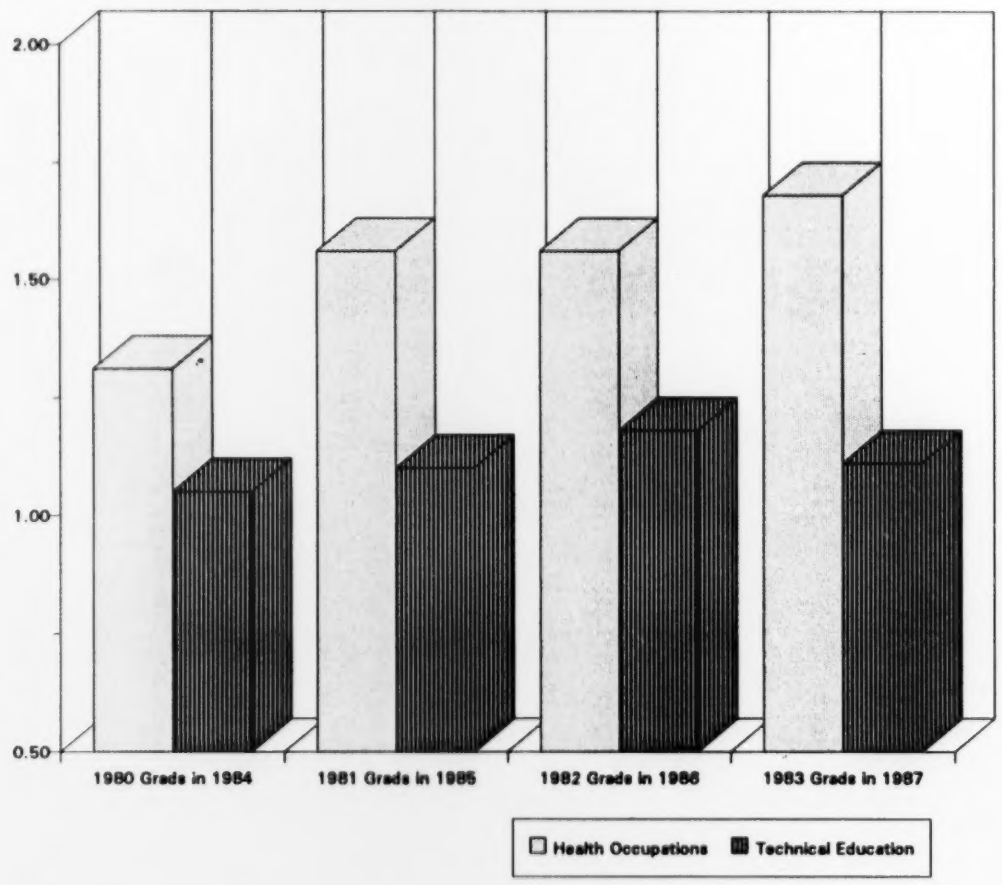
Table IIIE-1 and Diagram IIIE-A show the ratios of mean incomes of Associate Vocational graduates by program and region to the mean incomes of comparable groups for the 1983, 1982 and 1981 and 1980 completers in 1987, 1986, 1985 and 1984, respectively. This provides a comparison of their ratios of mean incomes to the mean incomes of comparable groups at the same point in the career path of vocational graduates, i.e. four years after completion of their programs.

TABLE IIIE-1

RATIOS OF MEAN INCOME OF 1983, 1982, 1981 AND 1980 ASSOCIATE VOCATIONAL EDUCATION GRADUATES TO MEAN INCOME OF COMPARABLE GROUPS IN GENERAL POPULATION BY VOCATIONAL PROGRAM AND REGION

VOCATIONAL PROGRAM	ALL REGIONS	OUTSIDE OHIO	ALL OHIO	CENTRAL OHIO	NORTHEAST OHIO	NORTHWEST OHIO	SOUTHWEST OHIO	BALANCE OF OHIO
HEALTH OCCUPATIONS EDUCATION								
1983 Graduates in 1987	1.68	1.65	1.68	1.44	1.54	1.71	1.51	1.85
1982 Graduates in 1986	1.56	1.54	1.54	1.39	1.32	1.74	1.45	1.74
1981 Graduates in 1985	1.56	1.52	1.54	1.31	1.51	1.58	1.45	1.88
1980 Graduates in 1984	1.31	1.34	1.30	1.14	1.36	1.34	1.30	1.45
TECHNICAL EDUCATION								
1983 Graduates in 1987	1.11	1.13	1.11	1.04	1.21	1.29	1.10	1.17
1982 Graduates in 1986	1.18	1.09	1.18	1.15	1.21	1.16	1.00	1.24
1981 Graduates in 1985	1.10	0.93	1.12	1.03	1.09	1.15	1.00	1.32
1980 Graduates in 1984	1.05	0.97	1.08	1.08	1.03	1.16	1.12	1.21

DIAGRAM IIIE-A
Ratios of Mean Income of 1980, 1981, 1982 and 1983
Associate Vocational Graduates to Mean Income of
Comparable Groups in General Population
by Program



CHAPTER IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

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SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Vocational education, as all forms of education, has a multidimensional effect on the welfare of individuals and society. The economic performance of graduates of vocational programs is a primary factor in the evaluation of vocational education.

In its measurement of the economic performance of graduates of vocational programs, this study uses an original source of information – federal income tax records. The federal income tax source avoids a number of limitations associated with follow-up studies utilizing questionnaires. The tax records data are standardized by type of income and by period (tax year), and do not rely on the memory nor the selectivity of individual responses to questionnaires. The data were provided in batch form by the Internal Revenue Service from its Information Returns Master File in full compliance with the strict requirements regarding disclosure of personal information.

The economic performance of vocational graduates in 1983 is examined in 1987, four years following their graduation. The data on 23,500 graduates of twelve secondary and two associate vocational programs are categorized by the area of residence in 1987 – any of five regions in Ohio (Central, Northeast, Northwest, Southwest, and Balance of Ohio) and outside Ohio. The income of graduates of vocational programs four years following their graduation is compared to the income of equivalent groups in the general population (same age group, years of schooling and region of residence). The results indicate predominately higher incomes for graduates of all secondary and associate vocational programs in the study. The overall mean incomes of Secondary Vocational graduates are higher by 10 to 79 percent and those of Associate Vocational graduates by 11 and 68 percent.

The performance of the 1983 vocational graduates in 1987 was compared to that of the 1982, 1981 and 1980 vocational graduates (as reported in I.A. Ghazalah, 1982 Vocational Education Graduates in 1986, and 1981 Vocational Education Graduates in 1985, Ohio University, 1991 and 1989 Long Term Follow-up of Vocational Education Graduates, Ohio University, 1989). The same data base, vocational programs and analytical techniques were used for the four chronological groups of vocational graduates.

The mean income of Secondary Vocational graduates exceeds the mean income of the comparable group in the general population for each of the four chronological groups. The margin for the 1983 graduates ranged from 10% to 79%. For the 1982 graduates from 19% to 75%. For the 1981 graduates the range was from 20% to 82%, and for the 1980 graduates from 16% to 72%. In the Associate Vocational programs, the margins for Health Occupations graduates for 1983, 1982, 1981 and 1980 were 68%, 56%, 56% and 31%. The equivalent margins for Technical Education graduates were 11%, 18%, 10% and 5%.

The study also investigated the geographic mobility of vocational graduates between 1983, their year of program completion, and 1987. The mobility rates for graduates of all vocational programs combined and for graduates of each of the vocational programs indicate a high percent of vocational graduates remaining in the state, an overall percentage of 85.42% (with a range from 78.49% to 88.76% for individual programs) in secondary programs and 81.73% in associate programs (84.24% for Health Occupations and 79.92% for Technical Education). The retention rates are higher for the 1983 than the 1982, 1981 and 1980 vocational graduates – 85.42% compared to 84.46%, 83.22% and 82.50% for secondary programs and 81.73% compared to 78.82%, 77.02% and 75.91% for associate programs.

The results of examining the economic performance of the 1983 vocational graduates (by reference to the comparable group in the general population) and comparing these results to those obtained for 1982, 1981 and 1980 vocational graduates indicate consistent income advantage of successive groups of vocational graduates.

The data and analyses of the data presented in this study show the value of utilizing federal income tax records as a reliable and consistent source of information on the performance of graduates of vocational education programs.

Knowledge of the performance of vocational graduates as a whole, as well as graduates of specific programs, would contribute to effective decision making. Longitudinal studies of groups of vocational graduates would provide information on the nature and level of the impact of vocational education and the change over time in this impact.